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ABSTRACT

The Development and Implementation of a District Computer Education Program conducted at Glasgow High School, Newark, Delaware, was designed to model full utilization of computer services in a public high school. The phases of the project included: (1) development of goals and objectives at the district level; (2) workshops for teacher training; (3) minicourses for students; (4) developing courses for the 1975-76 school year; and (5) establishing a long-range computer services plan for the district. This report discusses the historical development of the project, summarizes events in each phase, provides results of an evaluation, including numerous documents and exhibits illustrating the activities which took place during the project. (EMH)

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# THE DEVELOPMENT AND IMPLEMENTATION OF A DISTRICT COMPUTER EDUCATION PROGRAM

by

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Submitted in partial fulfillment of the requirement for the degree of Doctor of Education, NOVA University

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Maxi II Practicum
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# ABSTRACT

The practicum, "The Development and Implementation of a District Computer Education Program," was designed for the purpose of insuring full utilization of an in-house computer system in a high school. A second purpose was to establish goals, objectives, and directions for computer education on a District-wide basis. Phases conducted to accomplish these goals consisted of staff training, student training, and the preparation of a District Computer Education Curriculum Guide.

All phases were completed satisfactorily. Outcome measures indicate that there is a significantly higher number of teachers and students involved in computer education in the District in 1975-76 than in 1974-75. Significant, also, is the number of non-mathematics teachers involved. Finally, a District-wide Curriculum Guide was produced, which will provide the guidance necessary for the expansion of computer education in the other two high schools in the District.

# PREFACE

A wide array of scientific, economic, social, and technical factors are reshaping our world and, with it, the course of modern education. One such technological development is the computer, which is being utilized extensively and is playing a pervasive role in modern society. Banking, business, transportation, engineering, medicine, and social and scientific research are only a few of the many areas which are increasingly dependent upon the computer's speed in problem solving and its capacity for handling vast amounts of data. In addition, the computer is fast becoming a significant tool in the administrative and instructional processes of education.

The President's Science Advisory Committee stated that, since the computer is such a valuable and versatile tool in society, students attending school in the 1970's who have not been exposed to knowledge about computers will be poorly prepared for the world of the 1980's and 1990's. Although most school students will not be computer technologists, the influence of the computer on their future is so important that they should be made aware of its nature and function.

The influence of the computer will be felt by students in many ways. These include career selection, leisure activities, and management of personal finances. Moreover, the constitutional rights and the depersonalization of each individual can be affected.

"The Development and Implementation of a District Computer Education Program" attempts to formalize and pilot the necessary steps to bring this needed computer awareness to the students and staff in one school district. Although the direction taken was heavily influenced by such local factors as availability of hardware and funds, it is possible that this project could become a model for other school districts to emulate.

Whatever effectiveness this presentation might have results to a considerable extent from the interest, cooperation, and assistance provided by various personnel of the Newark School District. The assistance of Mr. John Brandt, Principal, Mr. Thomas Comer, Associate Principal, and Mr. Darrell Pelley, all of Glasgow High School, was particularly valuable. The insights and encouragement constantly extended by Superintendent Dr. George V. Kirk, and by Deputy Superintendent Dr. John E. Allen helped make the gathering of data and the writing of this practicum a rewarding experience.

# INTRODUCTION

"The Development and Implementation of a District Computer Education Program" is a multi-phased project designed to solve the problem of utilizing fully the computer system at Glasgow High School located in the Newark School District in the State of Delaware.

Briefly, the Newark School District is a K-12 District consisting of thirteen elementary schools, four middle schools, and three high schools. There are 16,900 pupils in the District. Elementary schools contain grades K-5, middle schools contain grades 6-8, and high schools contain grades 9-12. In addition, a state school for the hearing impaired is located in, and administered by, the District. There is also a vocational school under construction (scheduled to open in September, 1976) which will serve several districts but will be administered by the Newark District. In addition to Glasgow High School, the other two high schools are Christiana and Newark. Each of these high schools has approximately 1600 students enrolled.

The population of the Newark School District contains people representing all socio-economic backgrounds. While largely suburban middle class, all strata of society are represented. In short, its population looks more like a miniature cross section of the nation. This, then, is the setting in which this practicum was carried out.

The various phases of the project consisted of the developing of goals and objectives at the District level for computer education, the instituting of workshops for teacher training, the conducting of mini courses for students, the developing of courses for the 1975-76 school year, and the establishing of a long range plan for the District. In addition, a library of textbooks and programs currently in use was gathered and a bibliography of pertinent articles and publications was compiled.

The success of previous attempts to establish computer education has been minimal largely because computer education was regarded as the domain of the mathematics department. To overcome this problem, teachers from many disciplines were involved in the preparation of the District-wide goals and objectives and were also included in the teacher training sessions.

Active student involvement was also considered a necessary condition for the success of the project. Thus, students were given the opportunity to participate in mini-courses during the spring of 1975. In addition, a formal course was offered through the District's extended year program during the summer of 1975. The students who attended the summer course were given the opportunity to react to the District-wide goals and objectives as these were being formulated.

Although the major emphasis for implementation was to be in one school, efforts were made to include the sister high schools and the area vocational high school in the development of District plans. One result of the District-wide involvement has been a unified approach to the implementation of computer education. Subsequently, when the decision was reached during the course of the practicum to install in-house equipment in the sister high schools, many of the problems which Glasgow High School faced had already been solved, or at least considered.

While all phases of the practicum have been conducted, several have been expanded or modified as the situation warranted. Moreover, several additional activities related to the practicum were carried out. Where applicable, a discussion of these will be included later in the body of this report.

## HISTORICAL BACKGROUND

For practical purposes, the use of computers in Delaware Public School Districts and, more specifically, in the Newark District, began in the summer of 1966. The initial thrust was aimed largely at the administrative functions of business applications, student scheduling, and student reporting procedures. Minimal attempts were made to use the computer for instructional purposes.

Basically, three different organizations made, and are continuing to make, contributions to effective utilization of the computer in education. The first of these was an ESEA Title III project entitled Educational Development through Technology (EDTECH). The second is a project sponsored by the Delaware Schools Auxiliary Association (DSAA)* which came to be known in 1971 as Delaware's Total Approach to Computer Knowledge, more commonly called Project DELTA. The third organization is the Data Information Center for Education (DICE) which is a data processing installation funded wholly by a consortium of local school districts and devoted exclusively to serving school districts. A brief description of the activities of each of these organizations follows.

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*DSSA is a private, non-profit organization which derives its funds from school districts by providing a building plan inspection service. These monies are then to be used to fund pilot experimental projects in education.

## EDTECH

EDTECH was conceived, written, and originally funded through the Capital and the Marshallton School Districts in the State of Delaware under the ESEA Title III Act.

The major goal of this project was to integrate the computer into the everyday activities of education through a single statewide program. In addition to the sponsoring districts, cooperating agencies included the school districts of Wilmington, Newark, and Dickinson-McKean; the Delaware Department of Public Instruction; and the University of Delaware. The project was funded at $150,000 for the 1966-67 school year.

During that summer, several activities were initiated. The first was a six-hour seminar titled Educational Data Systems which was designed to acquaint administrators with the potential uses of the computer in education and to emphasize administrative functions.

A similar seminar devoted to computer-assisted instruction (CAI) was offered. Participants investigated the psychological implications of this type of instruction as well as an introduction to writing CAI programs in Coursewriter I (an IBM CAI language).

Another activity was the computer scheduling of three schools: Wilmington, Dover, and Christiana High Schools.

In order to carry out the administrative functions during the pilot year, funds were budgeted to secure computer services. Through an agreement with the University of Delaware in which each agreed to cover 50% of the costs, an IBM 1401 computer was installed in August, 1966, at the University's Computing Center.

During the school year of 1966-67, a major activity of the project consisted of implementing administrative functions such as report card printing. Meetings were held for administrators and teachers to acquaint them with these various functions. A minimal attempt was made during the year to pilot Computer Assisted Instruction (CAI) and Math Instruction Program (MIP) techniques. However, since only 7% of the budget was devoted to this phase, these activities were minimal.

For various reasons, mainly political, the EDTECH project was not funded during the 1967-68 school year. Because the second year's proposed budget was approximately $500,000, this one project would have tied up all the Title III funds in the state. This was not popular with those who were submitting other proposals. There was also a question about which district would assume the leadership role for the project.

The project was funded for a second year in April, 1968. This caused an awkward financial situation in as much as the project's fiscal year was not concurrent with the fiscal year of the rest of the state. The funding level for the second year was approximately $225,000, less than half the amount originally requested. Major cuts were made in the administrative application aspects of the project. The net result was a project which was 20% devoted to administrative functions of the computer and 80% devoted to MIP and CAI.

The summer's activities included many seminars conducted through the University of Delaware to acquaint and train teachers and administrators in various aspects of the computer in education. The course originally taught relating to the administrative aspects was repeated. In cooperation with DSAA, math and science teachers were trained in writing Fortran programs and in the use of terminals. Non-math-oriented teachers received training in writing basic programs, in the use of simulations, and in terminal operations. Still other teachers were being instructed in CAI and were writing programs which would eventually be used on the Philadelphia system, with which a cooperative venture had been established. The majority of the teachers trained were from the Newark, Marshallton, and Capital School Districts.

During the 1968-69 school year, three major activities were conducted. The first, called COMDET, was a joint venture between EDTECH and IBM in which touch-tone telephones were used to enable fifth grade students to interact with a computer for mathematics drill and practice. The materials used were adapted from the work of Dr. Patrick Suppes of Stanford University. The telephones, 12 each, were located in three elementary schools. Students would dial the computer which was located in Yorktown Heights, New York. After recognizing the student, the computer would verbally present a series of drill problems, the level of which was based on the student's previous successes or failures. The computer had a limited vocabulary, but it was sufficient to present problems and respond to students. The computer recorded the student's results and supplied the teacher with a daily summary. A statistical study showed no significant difference between this method and the traditional paper and pencil drill and practice method employed by control groups.

The second major activity involved three middle schools using computer-assisted instruction in reading. Two teletype terminals and one CRT terminal with a light pen response were utilized. Although the program was essentially adapted from the one used in the Philadelphia School System, some locally written material was also used.

The third major activity was called the Math Instruction Program (MIP). Under this phase, each high school in Newark (2) and Dover (1) was equipped with a terminal for time-sharing. Students were taught programming in various ways: through formal computer education courses; through informal courses before and after school; and through the existing math and science courses. Computer time was purchased from the Philco Ford Company, Valley Forge, Pennsylvania, and the Computer Sciences Corporation, Bala Cynwyd, Pennsylvania. As the utilization of the on-line terminal increased, additional equipment was added. The first configuration included one on-line teletype terminal, three off-line teletypes for tape preparation, and one Demex card reader attached to the teletype for card input. (Card preparation could be carried out on key punches located in the business department of each school.)

Under MIP, a portable teletype was available for time-sharing in the middle schools. For periods from two to four weeks each, the middle schools had the terminal available for computer instruction. Such instruction was directed toward the goal of increasing the students' (and the teachers') computer literacy under the MIP concept.

The funding for the third year was drastically reduced from that of the second year to $50,000. Again, state level politics played a significant role in the amount finally granted.

The only activity conducted during the summer of 1969, and the following school year was devoted to MIP. A single terminal was supplied to each of the three high schools. The time-sharing service was provided by an IBM 1130 computer housed at the University of Delaware and funded jointly by EDTECH and DSAA. During this year, the two projects conducted essentially the same activities, sharing costs and personnel alike. After the sophistication of the equipment utilized the previous year, the three EDTECH high schools were generally dissatisfied with the service. Since it was their first time-sharing experience, however, the schools sponsored through the DSAA project were generally satisfied. The EDTECH project officially was terminated in June, 1970.

## DSAA and Project DELTA

The original DSAA project started in the summer of 1966. It was designed to train high school mathematics and science teachers to teach computer programming to two or three high-ability seniors in each school during the 1966-67 school year. During the first year, the project was limited to eight public and private high schools located in New Castle County, Delaware.

The teachers chosen to participate attended a summer workshop in programming at the University of Delaware. The language taught was Fortran, and the machine used was an IBM 1620 housed at the University of Delaware. Participating teachers had direct access to the computer.

During the school year, the teachers instructed their students before or after school. On alternate Saturdays they accompanied their students to the University of Delaware's computing center. On these days, the students had the opportunity to run the programs they had written during the previous two weeks. In order to give the students maximum "hands on" computer time on the 1620, key punches were provided in each school for card preparation. The teachers were reimbursed for their time and the cost for computer time and key punches was absorbed by DSAA.

During the 1967-68 year, the project continued much the same as it had the first year. Contact was established between DSAA and EDTECH about the possibility of combining efforts should the EDTECH project be refunded.

During the summer of 1968, DSAA sponsored the training of additional teachers to expand their project. The training was conducted in cooperation with the EDTECH project. Furthermore the goals were revised to reflect more student involvement during the school year. Teachers were now encouraged to involve a class of students instead of merely the brightest two or three. The result was that the DSAA project and the EDTECH project were now operating along similar lines in the area of MIP.

The next school year's activities proceeded as in the previous year, but with increased student involvement, reflecting the change in philosophy. Plans were finalized for the joint funding of the IBM 1130 time-sharing system with the EDTECH project for the 1969-79 school year, with the result that DSAA's activities were essentially the same as EDTECH's.

During 1970-71, DSAA continued to grant minimal support to schools to provide time-sharing to high schools. This service was supplied through the University of Delaware's expanded computer center utilizing a Burroughs B5500. However, this arrangement proved less than satisfactory. Plans were formulated by DSAA from which the project known as Delaware's Total Approach to Computer Knowledge (DELTA) emerged. A project director was employed on a half-time basis; the other half of his time was spent working for the Data Information Center for Education (DICE). This sharing arrangement continued through the 1971-72 school year. In succeeding years, a full-time director has been employed.

For the spring of 1971, a Digital Equipment Corporation (DEC) PDP8/L was installed as an interim machine for the schools to use for time-sharing. In 1971-72, the PDP8/L was replaced by a PDP11/20. During this period, the machines were housed at DICE. In 1972, the project moved to the University of Delaware campus to facilities located in the College of Engineering. (It is interesting to note that they remain as a separate entity from the University of Delaware Computer Center.) In 1973, a PDP11/45 was installed to complement the PDP11/20. Currently, a PDP10 is being installed for the 1975-76 school year.

These machines were purchased by DSAA with financial support for operations received from the participating schools. Each school pays a flat rate which covers the teletype terminal, telephone charges, and computer service. Over the years, the school rate has been increasing to facilitiate their gradual assumption of the total operating costs.

According to Project DELTA literature, its announced goals were to supply time-sharing services for high schools in Delaware; to break the prejudice that computer knowledge is for "math-oriented students;" to explore how computer knowledge could become a learnable or a teachable concept; and to make clear to teachers the difference between CAI and computer knowledge.

In addition to these, several new objectives were added in 1974. These are:

> To provide stability and continuity for at least three years so that rational decisions can be made about computer education;
>
> To work with the University of Delaware in the development of teaching methods courses in the many disciplines utilizing a computer;
>
> To determine a feasible way whereby all students, K through 12, can eventually gain computer knowledge;
>
> To establish DELTA at the University as a research installation to provide all schools with a resource center constantly improving computer technology and curricula for the instruction of students on HUC (How to Use the Computer) and to support teachers' ever-increasing knowledge and interest in computer utilizations and applications.

In addition to offering time-sharing to teach programming, DELTA has an extensive program library available and various simulation packages including the Huntington Project materials. A guidance package taken from the Dartmouth Project (EXPRESS) data base has been offered, but this is being replaced by the package marketed by Time Share Corporation.

Seventeen schools were originally affiliated with DELTA in 1971. Currently, about 50% of the high schools in the State are affiliated with DELTA.

Plans are for Project DELTA to be funded for three more years by DSAA, with a gradual phasing out of their support as the schools assume a greater proportion of the operating costs.

## DICE

The Data Information Center for Education (DICE) is a data processing installation which was formed by a consortium of school districts in 1965. Previous to 1965, several districts maintained their own punch card shops. For the first two years, DICE continued as a punch card shop and utilized the EDTECH sponsored computer in 1966-67.

Originally, three school districts, Newark, Marshallton, and Dickinson-McKean, were supporting the system. Over the years other school districts have joined this consortium. At present seven school districts serving approximately 50,000 students are full-member districts.

In 1967-68, DICE installed an IBM 1401 4K card system.

This machine was supplemented by purchasing time on larger machines as needed for functions such as scheduling. In July, 1973, the 1401 system was replaced with an IBM 360 Model 22 computer.

Initially, DICE provided business and student accounting functions. In 1966, prescheduling data preparation services were provided to the schools using external computer scheduling packages. For instance, two high schools, Dickinson High School and McKean High School, started using the Stanford 4-S Program in 1966. DICE prepared the necessary cards for their scheduling runs. This resulted in a savings to them when they were actually sent to Stanford for their scheduling run. For the schools who had a more traditional schedule, the IBM 360 scheduler package was utilized. (This package has been modified extensively to reflect local needs and to utilize the DICE computer.) Currently, the IBM EPIC Socrates Package is being utilized on the DICE machine.

In 1971, test scoring and analysis were added as regular services. For the first two years, the analysis was conducted on a contract basis by DELTA. In 1973, test scoring became an in-house function utilizing the IBM EPIC Fast Package. Extensive modifications to the package were made to reflect local needs.

Over the years, DICE has remained devoted to serving the administrative needs of the school districts, preferring to leave the educational computer applications to others.

## Newark District Involvement

Through the years, the Newark District involvement in computer applications and computer education has been extensive. The District has contributed personnel and space to each of the three projects previously discussed.

Currently, all business functions, student accounting including secondary report cards, and test scoring are computerized through the services of DICE. The Newark District has had extensive influence on the addition of services by DICE since it was one of the original members of the consortium and because it is the largest District in the State.

Through DSAA and EDTECH, many teachers were trained in programming techniques and the utilization of computers in the instructional process. Time-sharing facilities which continue to be supported in the secondary schools are utilized primarily by mathematics and science teachers for teaching computer programming. However, some science and social studies teachers are using simulation packages as an integral part of their instructional program.

Continuous support to computer-related activities has been given by the Newark District administration. The use of the computer for administrative functions has been firmly established, but the degree of instructional utilization has fluctuated. However, in 1974, the opportunity to install in-house equipment in the District's newest high school became a reality. An outgrowth of this hardward acquisition was this practicum, resulting in a commitment to establish a complete computer education program in the high schools of the Newark District.

In summary, the preceeding is by no means a complete history of organizations and events affecting computer education in the State of Delaware and the Newark School District. In fact, the purpose of this historical development is merely to establish the level of computer utilization at the start of this practicum. Some of the recent activities have been mentioned and, where necessary, will be discussed in greater detail.

## THE DEVELOPMENT OF GOALS AND OBJECTIVES AND A LONG-RANGE PLAN FOR IMPLEMENTATION

The first major phase undertaken in this project was the development of a set of preliminary goals and objectives and a long-range District plan for computer education. Initial planning called for the development of each of these documents by separate committees. However, the two tasks appeared to be so completely interrelated that one committee divided into two subcommittees was formed to accomplish both tasks concurrently.

### Computer Education Workshop, Phase I, is Formed

For obvious reasons, meetings held at the conclusion of the school day are seldom productive. Thus, a proposal (Appendix - A1) was submitted to the Newark School District for the purpose of conducting a workshop for the committee during school hours. The site chosen was Glasgow High School. Following approval of the proposal, potential participants were identified and invited to the workshop. Concurrently, a second proposal (Appendix - A2) for a summer workshop was submitted for the purpose of preparing a formal computer education curriculum guide for the District.

In addition to insuring that committee members would be fresh and alert, holding the meetings during the school day enabled other interested staff members to participate. Also, the committee members could solicit student input immediately when it was needed. In all, four sessions were held during February, March, and April, 1975. Each was a full day session.

The committee consisted of twelve regular members. Included were four members of the Christiana High School staff, three members of the Newark High School staff, four members of the Glasgow High School staff, and the District Supervisor of Mathematics. Departments represented were business education, mathematics, science, and social studies. Others in attendance at various meetings included district administrators, a University of Delaware professor, and the principal-elect of the district vocational school (Appendix - A3).

Prior to the first full day session, participants were asked to bring any materials which might be pertinent to the tasks of the committee. Letters requesting information relating to computer education at the secondary level were sent to schools and organizations which had been identified as having some type of involvement with computer-related activities. These potential sources were identified from ERIC documents and bibliographies included in various articles and books. A sample letter, a sample response, and a list of the organizations contacted are included in Appendix A4. The response to these inquiries was disappointing. Many schools and organizations have implemented computer education programs at the secondary level, but the vast majority do not have formal goals and objectives established. However, during the course of the workshop, additional letters of inquiry were sent as additional sources were identified, in the hope that a well-defined set of goals and objectives could be obtained. None were received. Thus, for practical purposes, the committee started at point zero.

The first full day meeting was spent discussing the possible directions the District might take to establish a workable computer education program, to indicate what hardware needs would be necessary to carry out such a program, and to determine how the program would affect the curriculum as a whole. Subsequent meetings were devoted to discussing the specific needs of students and teachers and to formulating the long-range District plan and a preliminary set of goals and objectives. A copy of each of these is included in Appendix A5. In addition, the problem of incorporating these goals and objectives into the curriculum was considered.

At the conclusion of the workshop, the preliminary goals and objectives produced were distributed (Appendix - A6) to approximately 60 secondary teachers for their reaction and comments. The long-range plan (Appendix - A7) was included as part of the yearly report on computer activities and was forwarded to the Deputy Superintendent for his information and possible action.

All materials gathered, the preliminary goals and objectives, and the comments received from the teachers were subsequently used as input for the summer workshop.

## Computer Education Workshop, Phase II, Proceeds on Schedule

The summer workshop was held during June and July, 1975, and was three weeks in duration. Many of the staff members who served on the original committee participated in the summer workshop. (See Appendix - A8) It was felt that this would help make the task at hand easier since less time would be required for orienting people to what had taken place during the first workshop.

In order to facilitate the writing of the final curriculum guide, three members of the workshop worked full-time while the remainder participated only in the afternoons. The three working in the mornings devoted their time to the "hard" writing; the full group reacted to these efforts in the afternoons. In this way, more people were available for brainstorming and reactions to drafts which were generated at a faster rate by fewer people. The composition of the summer workshop was similar to that of the spring workshop. The total number of participants was less, but the same departments were represented.

Concurrent with the summer workshop, two other activities were held at Glasgow High School. One was a one-week teacher training workshop and the second was a seven-week summer school class for high school students. Each of these activities will be discussed later in greater detail. However, it is necessary to mention them at this point, because input for the curriculum guide was solicited from the students and teachers participating in them.

By the conclusion of the workshop, a curriculum guide for the District had been prepared. (See Appendix - A9) The guide is student-oriented, and it attempts to overcome the pervasive idea that computer education is the sole responsibility of the mathematics teachers.

In addition to goals and objectives, two appendices were included in the guide. The first is a list of films which can be used to meet some of the objectives in the guide. The second is a list of computer programs available in the District.

Approximately 200 copies of the guide have been prepared and have been circulated to teachers in the secondary schools. The guide is called an interim draft and will be revised as necessary after the 1975-76 school year. However, to date it has been well received by the teachers and should serve the purpose for which it was written.

## STAFF DEVELOPMENT

The second major phase of this project was directed toward staff development. A major objective of this phase was to introduce as many of the secondary teachers as possible to the computer. To accomplish this, several school and District level workshops were conducted. In addition, one District staff member was sent to a workshop conducted by Wang Laboratories, Inc.

### Staff Member Attends In-Depth Training Session

With the installation of the computer system at Glasgow High School in the fall of 1974, it quickly became evident that there was a need for at least one person to have in-depth training on the system. This was especially crucial if the hardware was to be used effectively within the school. Thus, when funds became available, (Appendix - B1) one person, Mr. Darrell Pelley, Mathematics Department Chairman of Glasgow High School, was chosen to attend a five-day in-depth training school at Wang Laboratories, located in Tewksbury, Massachusetts. The reasons for choosing Mr. Pelley were his previous computer knowledge and his ability to work constructively with other staff members.

Mr. Pelley attended the school during the week of February 3, 1975. This particular week was chosen in order that his training would be accomplished prior to the first District-wide inservice day. This was necessary because he was scheduled to conduct a workshop on computer education on those days.

Mr. Pelley's reaction to the school was extremely positive. He related that the class size was limited to eight participants. Also, an attempt was made to create a group with different backgrounds and varied application interest areas. Thus, he was the only educator in his group and had an opportunity to interact with people involved in military, medical, industrial, and construction applications.

The training Mr. Pelley received was very valuable for him personally. In addition, his expertise has been tapped by having him conduct workshops and by employing him as a leader of the workshop which developed the final goals and objectives for the District. Thus, the funds (Appendix - B2) used to send him were considered well spent, especially since similar hardware is being installed in the other high schools of the District for the 1975-76 school year.

## Spring Computer Inservice Workshop Conducted

Each year three days during the second semester are designated as District-wide inservice days in the Newark School District for which the Office of Instructional Services is responsible. In recent years, the trend has been to offer mini-courses for teachers designed to provide staff members with concrete experiences which can be later used in the performance of their jobs. Staff members are free either to choose any of the offerings provided by the District, or to submit an independent proposal for consideration.

One such course offered at the District level was designed to provide teachers with an exposure to computers in general, and to equipment at Glasgow High School in particular. The workshop was aimed at, but not limited to, the members of the Glasgow High School staff. Twenty-seven staff members (Appendix - B3) elected to take the course. Although some elementary and middle school teachers participated, the majority of the participants were from the high schools of the District.

Two sets of objectives (Appendix - B4) were identified: The first set for participants who knew little or nothing about the computers and the BASIC language, and a second set for participants who knew BASIC and were already familiar with a computer system. The participants were divided into these two groups, and the "beginners" were further subdivided into groups of three.

Following a short overview by the workshop leader, the instructional approach used for the "experts" was to turn them loose on a machine assisted by a staff member who had already mastered the machine. Half of the "beginners" groups were gathered into a lecture section, where they were given a short presentation of about 15 minutes and then given an assignment (from the assignment sheet, Appendix - B5) on the hardware. The second half of the beginners were then given the same presentation followed by the "hands on" assignment. In this way, the lecture groups and the "hands on" groups were rotated in order that the amount of knowledge to be handled was not excessive and to insure that immediate reinforcement via the hardware was accomplished.

Throughout the three-day workshop, an informal atmosphere was maintained. The advantages and disadvantages of the Glasgow hardware were pointed out to the participants, and efforts were made to provide the participants with examples of applications of the computer within their existing programs.

In summary, the participants rated the workshop extremely successful. This was significant when considering the fact that on the morning of the first day of the workshop, a vote was taken which authorized a state-wide strike, and teachers were highly agitated.

## Informational Meetings Held

Following the District inservice workshop, a series of two-hour informational workshops were held for District personnel. Invitations (Appendix - B6) were sent to the secondary schools in the District inviting staff members to see and try the computer facilities at Glasgow High School.

Three such meetings were held, with approximately twenty staff members attending each. The participants were given a short presentation about the equipment and Glasgow High School's plans for utilizing it. Following the presentation, the participants were given an opportunity to interact with the hardware, using canned similation and game programs.

The purposes for holding these meetings were to acquaint District personnel with the equipment and also to instill a more positive feeling about the use of computers in education. It appeared that these purposes were achieved, since many participants stayed for longer than two hours interacting with the equipment and discussing its possible applications.

## Summer Computer Workshop Conducted

A proposal (Appendix - B7) for a summer workshop for training teachers in the use of computers was quickly submitted in April, 1975, when it became apparent that the installation of computer systems in Christiana High and Newark High Schools was a distinct possibility. Following approval of the workshop proposal in May, 1975, a memorandum (Appendix - B8) was sent to the principals of the three District high schools requesting that they select ten participants for the workshop. They were encouraged to send teachers representing as many departments as possible, and in particular, the business education department.

Following receipt of the names of potential participants from the principals, letters of invitation (Appendix - B9) were sent. In all, thirty teachers representing many departments attended the workshop. (See Appendix - B10) Departments represented were English, social studies, science, business education, mathematics, industrial arts, and physical education.

The workshop which was held during the week of June 23, 1975, was similar in format to that of the spring workshop. Activities (Appendix - B11) included a brief survey of the historical development of computers and the growth of the historical development (educational and administrative) in the Newark School District. The participants were then given instructions on the use of the Wang 2200 computer. Following machine familiarization, the participants were introduced to the BASIC computer language and were given an opportunity to write programs. Finally, the participants were made aware of the canned programs available and were given an opportunity to try several for their reactions.

Throughout, the workshop was conducted informally. As in the spring workshop, the usual method of instruction was for half the participants to be working independently on the machines while the instructor was working more formally with the remaining half. In this way, hands-on time was maximized.

In general, the workshop appeared to meet its objectives. The participants rated the leader excellent, and except for the length (too short) and the number of participants (too many), they rated the workshop above average.

## School Level Workshops Conducted

Two related school-level workshops were also conducted during August, 1975. The first was a one-week workshop (Appendix - B12) held by the mathematics staff of Glasgow High School for the purpose of finalizing their 12th grade mathematics program. In addition, two of their objectives were to finalize the plans for the Computers I and Computers II courses and to write computer programs for use in mathematics courses.

The second workshop was a one-week workshop (Appendix - B13) held by the mathematics staff of Christiana High School for the purpose of introducing the mathematics staff to the computer hardware which was installed in September, 1975. Activities included instruction on this hardware and identifying and writing canned programs which can be used in the current mathematics classes.

Each of these workshops was planned to supplement the work being done at the District level on computer education.

## STUDENT INVOLVEMENT

### Glasgow High School Mini-Courses Held

Although teacher involvement is a necessary condition, it is not sufficient for successfully implementing computer education in the district. A second necessary condition is active student involvement. Thus, in order to make students aware of the capabilities of the computer system and the exciting activities that can be carried out with it, several mini-courses were conducted during the third quarter of the 1974-75 school year Glasgow High School. Originally, the plan was to offer two such courses, but the student demand and the structure of the existing master schedule necessitated that six such courses be formed.

In order to generate student interest in the mini-courses, several methods were utilized. These included: placing an article in the student newspaper (Appendix -C1); presenting daily announcements over the school intercom; and making announcements by the mathematics teachers to each of their classes. Efforts were made to encourage students of all levels to participate, and each student who indicated an interest was invited to attend the classes.

Since the course was computer-oriented, student invitations were printed on the computer (Appendix - C2). Thus, when the classes were actually initiated, forty-three students (Appendix - C3) representing all grade levels and all ability levels were enrolled.

Classes for instruction consisted of the students meeting with the District Supervisor of Mathematics on a formal basis one, two, or three periods a week. The students then spent several additional periods per week working independently. The instructor (the Supervisor of Mathematics) was available on Tuesday and Friday mornings and on Wednesday afternoons for this formal instruction. During the periods when the instructor was not available, several members of the mathematics department donated their time to assist the students. Even with this additional help, there were certain periods when there was no adult supervision. However, the students were still encouraged to utilize the equipment during these periods if they were free. It was gratifying to note that no acts of vandalism took place during the unsupervised time.

Topics covered during the formal instructional periods included: machine operation, including use of the machine in the immediate mode, tape loading, and execution of canned programs; elements of the BASIC language; diagnosing of program errors; and simple computer programming (See Appendix - C4 for sample student materials). For the students who quickly mastered these topics, individual programming problems were assigned. These problems were chosen on the basis of the students' current curriculum. For instance, a business education student would be assigned a problem to write a program which would generate compound interest, while a college preparatory student would be assigned a problem to write a program which would find the factors of a quadratic equation.

Evaluation of students was conducted on an individual basis. Since no credit was being awarded, formal letter grades were not kept. Rather, a record of task completion was compiled. Each student completed the competency tasks in the presence of the instructor when the student felt he was ready. For example, when a student mastered the handling of the cassette tapes, he requested a competency check-out. He would then perform the tasks on the Tape Cassette Check-out List (Appendix - C5) in a random order designated by the instructor. If the student did not successfully complete the tasks, no failure was recorded. Similar check-out lists (Appendix - C6) were used for other tasks. Only successful completions were recorded.

In addition to the students who formally signed up for this course, many others participated informally. Students who dropped in to see what was going on were encouraged to play a game on the computer or use a canned program. The formal participants were eager to assist these drop-ins by helping them use the games and canned programs and by explaining what they were currently working on. (See Appendix - C7 for examples of student-generated programs) Many of these drop-ins were business education students who were encouraged to participate in this manner by their teachers.

Although the courses were scheduled only for the third quarter, many students requested that the program be continued into the fourth quarter. However, because of time constraints, the instructor was available on Tuesdays only. Although less formal instruction was now available, the program continued because there were now many students knowledgeable enough to answer the questions that the new participants would raise.

Overall, the program was considered a successful one. Students signed up knowing they would not receive credit. They continued to participate even though it meant giving up their free time. Further, many of these students elected to take the credit courses established for the 1975-76 school year.

## Extended Year Program Computer Course Established

Each summer, the Newark School District conducts an extended-year program as part of the regular summer school program. The courses included in this program are designed to give students experiences they could not obtain during the regular school year. The courses are free and credit is given for the ones designated high school level.

For the summer of 1974, an attempt was made to initiate a course called "Mathematics Through the Computer." For several reasons (the main one being lack of publicity) the course did not "make." However, since it was felt that the course had merit, plans were made to implement a similar one in the summer of 1975.

In 1974, the only computer service was through a single terminal. Thus, it was necessary to revise the course guide for the summer of 1975, to reflect the installation of the in-house equipment. The revision of the course guide (Appendix - C8) was contracted to the potential instructor, Mr. Carl Jacobson, of Glasgow High School. In addition to a brief description (Appendix - C9) in the summer school catalog, a flyer (Appendix - C10) was distributed to the secondary schools of the District to publicize the course.

Because the majority of the summer school courses are conducted at Newark High School, a problem relating to the transporting of students arose. This problem was solved by establishing a shuttle run from Newark High School to supplement the regular bus routes. However, the length of the course then needed to be extended to seven weeks to make up the time lost for transporting students in order that a credit could be awarded. Thus, the course met for seven weeks instead of the regular six weeks.

Initially, twelve students (Appendix - C11) enrolled in the summer course, eleven boys and one girl. Ten students attend Glasgow High School and two attend Newark High School. Nine of the twelve completed the course satisfactorily. Several other students who originally indicated an interest in the course gave as their reasons for not enrolling the transportation problem and the need for extending the class to seven weeks. There was also a communication problem in that one high school (Christiana) and the four District middle schools did not receive the special flyers describing the course. Thus, a sizeable potential population was missed.

Four of the students who completed the course are currently in eleventh grade while the remaining five are tenth graders. Three levels of students were represented: honors level; regular college preparatory level; and technical track level. On the basis of his experiences in the summer course, one student has changed his math course from the technical level (Elementary Geometry) to the college preparatory level (Geometry I).

Many materials were used in the course. These included technical manuals supplied by Wang Laboratories, a text by Neal Golden (Computer Programming in the BASIC Language), a text by Rudd Crawford and David Copp (Introduction to Computer Programming), and a wide array of regular mathematics textbooks.

Because of the limited enrollment and the varied backgrounds of the students an individualized instructional approach was desirable and, in fact, necessary. Following an introduction to the hardware and minimal instruction in elementary computer programming, each student was assigned specific programs to write. The student's program assignment was chosen on the basis of his mathematical background. However, instead of choosing topics which had been covered in his previous course, the topics were chosen from the course he would be entering. Thus, the student was not only responsible for a programming assignment, he was also responsible for determining and then learning the necessary mathematics needed to complete the program. By using this approach, the student assumed the role of programmer analyst as opposed to being merely a programmer.

The benefits of this approach were three-fold. The student had the oportunity not only to learn and practice programming skills, but to learn additional mathematical content. The third benefit was the skill that the students developed concerning the use of mathematics textbooks as references. Initially, the students were extremely reluctant to investigate a mathematical topic on their own. However, as the course progressed, the students became less dependent upon the teacher and relied more heavily on their own ability to interpret material found in the texts.

Because credit was offered for the course, a more formal evaluation procedure was necessary. Students were given grades based on the number and degree of sophistication of the programs written. (See Appendix - C12 for a list of the more sophisticated programs generated by the students.) In addition, a final exam was administered which covered all aspects of programming. Final grades awarded consisted of two A's, four B's, and three C's. It might have been expected that the grades would closely correspond with the level of the course which the student would be entering, but this was not necessarily the case. There was a correspondence, but it was weak, at best.

Overall, the summer course was successful. At the end of the course the student exhibited a knowledge of programming skills which should be useful to them in future years. Although the enrollment was somewhat disappointing, the course will be offered again next summer. Plans are being made to overcome the enrollment problems and, should these be successful, it is expected that many additional students will take advantage of the benefits of the course.

# RELATED ACTIVITIES

Before and during the course of this practicum, several activities took place which had a direct bearing on, or were an outgrowth of, the practicum. Some were local in nature, while others have State-wide implications.

## State-Wide Council for Computer Education Formed

In 1973, a State-wide Council for Computer Education was formed by the State Supervisor of Mathematics (Appendix - D1). The council consists of members from education, business, and industry and its purpose is to advise the State Department of Public Instruction on matters relating to computer education. This author has been a member of the council since its inception.

Each year, one of the recommendations of the council has been for State support for computer education. In 1975, this recommendation was adopted by the State Board and included in the State budget, with the result that districts could apply for matching funds for the 1975-76 school year. A total of $48,000 was allocated by the State for this purpose. These funds can be used for terminal rental, computer maintenance, or purchasing computer hardware. The amount budgeted for 1975-76 is minimal ($1,500 per high school, to be matched by the local district), but it is a step in the right direction. To date, the Newark School District has received State funds totaling $4,500 (Appendix - D2), and is scheduled to receive an additional $2,200.

The council has also engaged in other activities. These include sponsoring informational meetings (Appendix - D3) and computer education courses at the University of Delaware, such as the one designed to acquaint mathematics teachers with the Colorado Algebra through the Computer Project.

## State-Wide Computer Task Force Formed

A second State-wide effort in which this author is involved is the State Computer Task Force which is charged with the responsibility of creating a State-wide plan for computer utilization in education. The task force initially met in July, 1975, and expects to complete its work by February, 1976 (Appendix - D4). The plan will encompass both educational and administrative uses of the computer. Many of the members of this task force are also members of the State Council for Computer Education; thus, the task force will be generating a plan very much in line with the thoughts of the advisory committee.

### H.B. 509 Proposal Submitted

Shortly after this practicum was started, a conversation with the District Supervisor of Occupational and Vocational Education precipitated a proposal (Appendix - D5) for House Bill 509 funds. Briefly, H.B. 509 provides State support for teachers, and operational funds for approved occupational-vocational programs conducted in the comprehensive or vocational schools, grades 7-12. The proposal was submitted and initially rejected. However, after meeting with State officials, minor modifications were made, the project was resubmitted, and approval was granted in May, 1975.

The approval of this proposal at Level 3 funding means that three times the normal operating funds will be available to Glasgow High School for their Computers I and Computers II courses.

### Newark School Board Supports Computer Education

Another item of interest which has been an outgrowth of this practicum is the complete support of the Newark School District Board of Education to computer education. On May 20, 1975, the Board unanimously passed a motion (Appendix - D6) to amend the budget by $80,000 for the purpose of installing in-house computer equipment in the District's other two high schools (Newark and Christiana), and to add a time-sharing terminal at Glasgow High School, which only had in-house equipment.

The major presentation to gain support for this motion was made by a student at Glasgow High School. Supportive data were supplied by a teacher and the associate principal at Glasgow High School. Thus, through the unselfish efforts of the people at Glasgow High School, the two sister schools gained immensely.

After the approval of the budget amendment, bids (Appendix - D7) were solicited for computer systems for Newark and Christiana High Schools. The low bidder was Wang Laboratories, Inc. The bid was awarded to them by the Board in July, 1975, (Appendix - D8) and systems similar to the Glasgow in-house system were installed in September, 1975.

Concurrently, time-sharing terminals were ordered

(Appendix - D9) for all three high schools for the 1975-76 school year; one each for Glasgow and Newark High Schools, and two for Christiana High School. The decision was made to place two at Christiana High School because of the physical nature of the plant. The school consists of two buildings, with the mathematics and guidance departments housed in one, and the science and social studies departments housed in the other. Placing an extra terminal at Christiana High School seemed to be the logical direction to take because of the heavy utilization by the departments previously mentioned.

Computer service is supplied by Project DELTA's system on a twenty-four hour basis. In addition to providing computer time and a library of canned programs, for the first time this year the system is providing a guidance package supported by State funds. The guidance package is the one marketed by Time Share Corporation, and provides information on both college and vocational choices open to students.

Heavy utilization of the guidance package is expected in each of the three high schools. Guidance counselors have been given instruction on how to use the package.

Each school has instituted a system utilizing student aides. These aides assist other students who need help accessing the package. In this manner, the schools expect to acquaint each junior and senior with the system.

Mass utilization of the guidance package is now possible because of the installation of in-house computer equipment in each school. This enables students who are learning programming to do their work on the in-house machines, thus leaving the time-sharing terminal free for utilization of the special packages.

## ACTIVITIES PLANNED FOR 1975-76

### Computer Offerings (1975-76)

For the 1975-76 school year, two courses, Computers I and Computers II, are being implemented at Glasgow High School. Computers I is a nine-week course, while Computers II is an eighteen-week course. In addition, an independent study course, Computers III, will be implemented during the 1976-77 school year.

Seventy-two students have enrolled in Computers I, while thirty-seven students have enrolled in Computers II. The majority of the students who elected these courses are juniors and seniors. In future years, it is hoped that more freshmen and sophomores will be able to elect the courses. This will enable them to use the computer knowledge in subsequent studies.

To insure that all business students will have an exposure to computers, a one-week block of the Typing I class will be devoted to the subject. This subject was chosen because it is the only class in which all business students are enrolled. It is anticipated that the same plan will be utilized at the sister high schools (Newark and Christiana) either this year or next.

As schedules had already been established before the decision to install in-house equipment had been made, computer offerings at Newark and Christiana High Schools are limited to a single eighteen-week course in each school. This course is comparable to Computers II offered at Glasgow High School. Eighteen students are enrolled at Christiana High School, and twenty-one students are enrolled at Newark High School. Plans are being made to expand these offerings for the 1976-77 school year, and the meeting of certain objectives in existing courses (especially social studies) will be accomplished during the 1975-76 school year. In addition, both Newark High School and Christiana High School are planning to offer Computers III (the independent study course) for a few students this year.

Thus, course offerings in computer education have been expanded at Glasgow High School for the 1975-76 school year, and will be expanded at Christiana and Newark High Schools for the 1976-77 school year.

### A Night School Class is Planned

Plans have been formulated to offer an introductory computer education course in the Newark School District

Adult Evening School. The course will be offered during the spring of 1976, and will be open to anyone who is interested, including students who might not be able to schedule a computer course during the regular school day.

Because funds for computer time are no longer necessary, the tuition will be minimal. (It has tentatively been set at $16 for the ten-week course.) The course can be conducted at any one of the District high schools.

### Computer-Related Activities are Planned for Inservice Days

Several computer-related activities were planned for the secondary half-day inservice sessions. The first was a school-wide program, held on October 21, 1975, at Glasgow High School, where the personnel of each department were shown the canned programs available and given an opportunity to evaluate them. Informational meetings for the business education and social studies departments of Christiana and Newark High Schools were planned for November, 1975, and a "swap" session for all three high schools is to be held in December, 1975. Additional sessions will be held as the need arises.

# EVALUATION

## Introduction

Because the overall goal of this practicum was to provide a curriculum in computer education for students, and thus utilize the existing computer system at Glasgow High School, the overall success of the implementation phase was to be evaluated on the basis of the degree of student and teacher involvement in computer education at the school in September, 1975. However, as the practicum progressed, sufficient involvement of students and teachers from Newark High School and Christiana High School has necessitated that data on their involvement also be included.

In addition an attempt was made at the completion of the practicum to conduct a goal-free evaluation. That is, what was happening in computer education in the District when the practicum started was compared to what is happening now.

Throughout the practicum, formative evaluations were carried out based on task completion, evaluation of workshops by participants, the evaluation of workshop participants, and the evaluation of student performance.

## Participants Evaluate Workshops

Newark District policy dictates that participants are to be given the opportunity to evaluate inservice programs and workshops. Thus, at the conclusion of the computer education inservice courses, each participant was asked to complete the District's Inservice and Workshop Opinion Survey. Using this form, participants can rate the various aspects of the program on a one to five scale where one is low and five is high. In addition, they are asked to list any strengths and/or weaknesses they observed during the workshop.

Twenty of the twenty-seven participants in the spring computer inservice program returned a completed form. The vast majority of the participants rated the eleven items on the form above average. That is, they were given a four or five rating. Comments listed under strengths of the workshop included the instructor's knowledge, and sufficient equipment for hands-on experiences. Comments noted under weaknesses included too many participants, and mixing "experts" with people who "know nothing."

Twenty-eight of the thirty participants of the summer workshop returned a completed form. The responses were similar to those obtained from the spring workshop. The majority of the participants gave nearly all items on the survey sheet a rating of four or five. The single exception was the length of the workshop. A second item which was not rated as high by this group as the spring group was the one asking about "take home" plans. One possible reason for these lower ratings was the composition of the classes. The spring class contained a significant number of mathematics teachers while the summer class did not.

In summary, the overall impression of the workshops by the participants was highly satisfactory, and plans are being made to provide similar offerings during the 1975-76 school year. The complete results of these surveys are contained in Appendix - E1.

Workshop Participants are Evaluated

During each workshop, each participant was tested to determine his knowledge of hardware utilization and of the BASIC computer language. Testing was conducted by having each participant demonstrate to the instructor, or his designee (usually a participant who had already mastered the skill), his ability to carry out the task. The following is a list of the tasks and the percentage of participants completing each task satisfactorily.

| | Task | % Completed Spring | % Completed Summer |
|---|---|---|---|
| 1. | Initialize the computer | 100% | 100% |
| 2. | Use the machine in the immediate mode | 100% | 100% |
| 3. | Load a program from tape | 100% | 100% |
| 4. | Save a program on tape | 100% | 100% |
| 5. | Write a simple program without branching | 100% | 100% |
| 6. | Write a simple program with unconditional branching | 100% | 100% |
| 7. | Write a simple program with conditional branching | 100% | 100% |
| 8. | Write a simple program with a loop | 100% | 100% |
| 9. | Write a program which utilizes array variables | 78% | 63% |
| 10. | Write a program which utilizes string variables | 52% | 43% |
| 11. | Write a program which utilizes hex codes | 37% | 33% |

Thus, based on the observations made by the instructor, every participant was able to initialize the computer, use it in the immediate mode, load computer programs from tape, save computer programs on tape, and successfully write simple programs in BASIC at the conclusion of the workshop. In addition, many participants could use more complex commands, and were starting to prepare a computer program which could be used in their own courses. In short, the majority of the participants met the objectives of the workshop.

## Composition of Workshop Participation is Evaluated

One of the implied goals of this practicum was to involve as many people as possible on a District-wide basis. To determine if this goal was accomplished, background data on workshop participants was compiled. Tables #1, #2, and #3 summarize this effort.

Composition of Workshops by Sex

Table #1

| Workshop | M | % | F | % |
|---|---|---|---|---|
| Spring Computer Inservice Workshop | 16 | 59 | 11 | 41 |
| Summer Computer Workshop | 18 | 60 | 12 | 40 |
| Computer Education Workshop - Phase I | 10 | 83 | 2 | 17 |
| Computer Education Workshop - Phase II | 11 | 92 | 1 | 8 |
| Glasgow High School Workshop | 6 | 75 | 2 | 25 |
| Christiana High School Workshop | 5 | 62 | 3 | 37 |
| TOTALS | 66 | 68 | 31 | 32 |

## Composition of Workshops by School

### Table #2

| Workshop | CHS # | CHS % | GHS # | GHS % | NHS # | NHS % | OTHER * # | OTHER * % |
|---|---|---|---|---|---|---|---|---|
| Spring Computer Inservice | 5 | 18 | 9 | 33 | 6 | 22 | 7 | 26 |
| Summer Computer Workshop | 9 | 30 | 11 | 37 | 10 | 33 | -- | -- |
| Computer Education-Phase I | 4 | 33 | 4 | 33 | 3 | 25 | 1 | 8 |
| Computer Education-Phase II | 4 | 33 | 4 | 42 | 2 | 17 | 1 | 8 |
| Glasgow High School | - | -- | 8 | 100 | -- | -- | -- | -- |
| Christiana High School | 8 | 100 | -- | -- | -- | -- | -- | -- |
| TOTALS | 30 | 31 | 37 | 38 | 21 | 22 | 9 | 9 |

*Includes participants from middle schools, elementary schools, Central Administration, and Sterck School.

### Composition of Workshops by Subject Area

Table #3

| Workshop | Bus. Ed. | | Lang. Arts | | Math | | Sci. | | Soc. Stud. | | Other* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | # | % | # | % | # | % |
| Spring Computer Inservice | 1 | 4 | 1 | 4 | 16 | 59 | 2 | 7 | 2 | 7 | 5 | 19 |
| Summer Computer | 3 | 10 | 7 | 23 | 3 | 10 | 3 | 10 | 10 | 33 | 4 | 13 |
| Computer Education - Phase I | 2 | 17 | -- | -- | 5 | 42 | 2 | 17 | 1 | 8 | 2 | 17 |
| Computer Education - Phase II | 1 | 8 | -- | -- | 7 | 58 | 2 | 17 | 1 | 8 | 1 | 8 |
| Glasgow High School | -- | -- | -- | -- | 8 | 100 | -- | -- | -- | -- | -- | -- |
| Christiana High School | -- | -- | -- | -- | 8 | 100 | -- | -- | -- | -- | -- | -- |
| TOTALS | 7 | 7 | 8 | 8 | 48 | 49 | 9 | 9 | 14 | 14 | 10 | 10 |

*Includes physical education, administration, industrial arts, elementary education, and foreign language.

It can be seen from the preceding tables that members from all three high schools were involved in the training workshops and in the preparation of the curriculum guide. Further, it can be seen that a significant number of persons representing areas other than mathematics participated. The number of females participating was also encouraging.

Success was not achieved in the attempts made to involve the members of the Hodgson Vocational-Technical High School. This was probably due to the fact that only two staff members (principal and curriculum coordinator) have been appointed to date. With construction problems foremost in their minds, they have little time available to devote to matters pertaining to curriculum. Contact has been maintained, and several teachers who participated in the development of the District Computer Curriculum Guide will be involved when Hodgson's computer curriculum is established.

Thus, while there is still a tendency for computer education activities to be dominated by males and mathematics teachers (especially in the development of the computer curriculum guide), inroads have been made to dispel the thinking that computers should be controlled by males and are only for the mathematics department.

### A Follow-Up Survey of Workshop Participants ~~is~~ Conducted

In order to determine if the computer education workshops made an impact on the participants, a survey was conducted in October, 1975. Each person who attended one of the workshops and who has access to an in-house computer was asked to complete the follow-up survey form. Sixty-four forms were sent out and fifty-seven (eighty-nine percent) were returned.

Questions included in the survey were generally directed toward personal knowledge, instructional applications, and other applications. The majority of the participants who returned the survey indicated they thought they could operate the in-house equipment, explain to another person how to operate the equipment, and write a simple program in BASIC; however, only about fifty percent have actually done so.

In the area of instructional applications, thirty-three percent of the respondents indicated one or more classroom applications were being used. An additional thirty-four percent indicated they were planning to make use of computer applications in the future. Thus, sixty-seven percent have made use, or are planning to make use, of computer applications in their classroom. In addition, sixty-five percent indicated they have discussed computers and their uses in their classrooms, and an additional twenty-four percent indicated they plan to do so.

The number of people indicating they developed computer applications in non-instructional areas was the same as the number indicating instructional uses; however, the applications were less varied, with the majority being grading applications.

In summary, sixty-five percent of the respondents discussed computers in their classrooms; thirty-three percent have implemented computer applications in their classrooms; and thirty-three percent have developed non-instructional uses. If the respondents who have indicated they are planning to discuss or use computers follow through, a significant number of workshop participants will have utilized information gained from one of the workshops. (See Appendix - E2 for a summary of survey results.)

## Students in Mini-Courses are Evaluated

As was done with teachers who participated in workshops, students who participated in the mini-course were tested to determine their knowledge of hardware utilization and of the BASIC computer language. Testing was carried out by having each student demonstrate his ability to carry out the task. The following is a list of the tasks and the number and percentage of participants completing each task satisfactorily.

| | Task | Number | % |
|---|---|---|---|
| 1. | Initialize the computer | 43 | 100% |
| 2. | Use the machine in the immediate mode | 43 | 100% |
| 3. | Load a program from tape | 43 | 100% |
| 4. | Save a program on tape | 42 | 98% |
| 5. | Write a simple program without branching | 42 | 98% |
| 6. | Write a simple program with unconditional branching | 38 | 88% |
| 7. | Write a simple program with conditional branching | 29 | 67% |
| 8. | Write a simple program with a loop | 36 | 84% |
| 9. | Write a program which utilizes array variables | 12 | 28% |
| 10. | Write a program which utilizes string variables | 14 | 33% |
| 11. | Write a program which utilizes hex codes | 19 | 44% |

As can be seen from the list, all students demonstrated the ability to initialize the computer, use it in the immediate mode, and load specific programs. The majority of the students also demonstrated the ability to write and execute simple programs.

Students were less successful when the more sophisticated commands were presented; however, this was probably due to their inadequate mathematical background. This was particularly noticeable in their inability to easily master the ideas behind array variables. More success was seen with the use of hex codes. The novelty of being able to control the curser on the cathode ray screen may possibly have contributed to this.

Overall, however, the mini-courses served their initial purposes. Students were made aware of the capabilities of the computer system, and they demonstrated the skills necessary to utilize it.

### A Follow-Up Student Survey is Conducted

Students who participated in the mini-courses, and those who completed the summer course, were surveyed in Octber, 1975, to determine if they were utilizing the knowledge acquired. The survey was conducted by inspecting the class lists for Computers I and Computers II at Glasgow High School to see how many had signed up for a formal course, talking with the students, and contacting staff members who might be utilizing their services.

The class lists indicated that twelve of the forty three students had signed up for Computers I and/or Computers II:

Four had signed up for Computers I only; two had signed up for both courses; and six had signed up for Computers II. In addition, nine students have indicated they intend to sign up for one of the courses next year. One student who participated in the mini-course also completed the summer course. Thus, thirteen students, or thirty percent of the mini-course participants, are participating in formal courses, and twenty-one percent have indicated they plan to do so in the future.

Three summer participants and two mini-course participants are acting as student aides to the guidance counselors responsible for introducing students to the guidance package on the time-sharing terminal. Two of the summer participants are at Newark High School, while the two Glasgow High School mini-course participants are also among those who have signed up for formal courses this year.

Five students (two who were previously included as participating in a formal course this year) are currently working on a project for two social studies teachers in which they are attempting to analyze data for an economics class. Three others are preparing demonstration programs for four science teachers who are team teaching an introductory science survey course. In addition, nearly all the students who are currently enrolled in a mathematics course indicated that they are doing some programming in these courses.

Thus, of the fifty-one students who participated in a mini-course and/or the summer course, eighteen, or thirty-five percent, are actively engaged in a formal course and/or an assistant role. In addition, others have indicated they plan to participate at a later date, or are currently using their knowledge in their current mathematics courses. Therefore, it seems safe to conclude that a group of knowledgeable and interested students now exists.

### A Computer Curriculum Guide is Produced and Accepted

One of the major goals of this practicum was to produce a District Computer Curriculum Guide. As indicated previously, this was completed in July, 1975. The guide has been endorsed by the Director of Instruction of the Newark School District as indicated by his signature on the Foreword, and has been distributed to all members of the business education, mathematics, science, and social studies departments of each high school. In addition, administrators and members of other departments who participated in computer education workshops also received a copy.

## Action is Taken on Recommendations and Long-Range Plans

The recommendations and long-range hardware implementation plans generated by the committee working in the spring were well received, and action has already been taken on many of them. One measure of success in this area is the amount of money spent by the Newark School District for computer-related activities: $7,300 has been spent for workshops; $12,000 for time-sharing terminals; and $71,000 for in-house computers, for a total of $90,300. In addition, $35,000 was previously spent for the in-house computers at Glasgow High School.

Thus, with the hardware on hand, recommendations are being accepted relative to establishing courses and involving computers in the curriculum. School level personnel now view computer education as being here and now, and not something which would be "nice for the future."

## A Summary of "What is Happening Now" at Glagow High School Is Conducted

In the course of determining what effect the mini-courses and workshops had on students and teachers at Glasgow High School, an attempt was also made to ascertain the scope of current computer-related activities. In October, 1975, two days were scheduled for an on-site school visitation to accomplish this task. During the visitation, conversations with administrators, teachers, and students produced the following composite list of current activities:

1. Three sections of Computers I with an enrollment of seventy-two;
2. Two sections of Computers II with an enrollment of thirty-seven;
3. Five students serving as aides to the guidance counselor responsible for introducing students to the computerized guidance package;
4. Eleven teachers using a computerized grading system. Several others indicated they are going to convert to a computerized system.
5. Three mathematics teachers using the computers for tutorial drills in the basic skills classes.

These same teachers also use the computerized games as a reward for students who satisfactorily complete their work.

6. One mathematics teacher teaching computer programming to a basic mathematics skills class as an enrichment topic.
7. The baseball coach utilizing a program which updates the team statistics after each game.
8. The agriculture teacher using the computer for CAI and testing in the area of plant identification.
9. The German teacher and the French teacher each working on a CAI program for the study of vocabulary and sentence structure.
10. Physics students using the computer as a problem-solving tool.
11. Biology students utilizing statistics programs in connection with yeast growing experiments in two biology classes.
12. Mathematics students (all levels) using the computer as a problem-solving tool.
13. Social studies students preparing computerized simulations for a project.
14. Business education students in the Business Machines course being exposed to the computer.

In addition, many staff members and students indicated that they are planning additional activities; however, these were not included in the previous list as the intent was to determine what was actually happening. Thus, it seems reasonable to conclude that many computer activities are being carried out and the in-house equipment is being utilized extensively.

## A Comparison of the Past to the Present

From 1968 until 1974, the use of computers for instructional purposes, with one exception, was limited to a single time-sharing terminal in each high school. The exception was during the 1968-69 school year, when additional back-up equipment was installed in the high schools, and some CAI activities took place in one middle school and one elementary school when Federal funding was available. During this period, the student-terminal ratio was approximately 1800 to 1.

During the 1974-75 school year, four in-house computers were installed in Glasgow High School, and terminals were maintained in the other two high schools. In 1975, Christiana High School and Newark High School each received four in-house computers, and two additional time-sharing terminals were installed. Thus, the present student-terminal ratio is approximately 300 to 1. The literature indicates a maximum ratio of 500 to 1 to successfully implement a computer education program, and it is anticipated that the program initiated during the course of this practicum can be maintained. Further, since the financial effort has largely been at the local level, the problem of program curtailment due to the expiration of external funding has been by-passed.

A comparison of the numbers and types of persons involved over the years also indicates that computer education has become firmly established. Before 1974, the use of computers was basically limited to applications made by mathematics and science teachers, and limited to high school students. During the past year, this has been expanded to include students of all abilities and teachers of many disciplines. Thus, through hardware acquisition and student and staff training, the Newark School District has reached the point where a meaningful computer education program can be maintained.

# SUMMARY

Evaluations indicated that the various phases of the practicum were successful. Computer courses have been established at Glasgow High School, a significant number of students and teachers have been introduced to computers, and a curriculum guide has been produced. The District has made possible the expansion of computer education at Christiana High School and Newark High School by purchasing the necessary in-house equipment.

One disappointing note has been the lack of interaction with the staff of the Hodgson Vocational-Technical School. However, continuous attempts will be made in the future to establish contact in order that the programs carried out in the comprehensive high schools will complement the vocational-technical school's program.

Though this practicum has come to its conclusion, there are many additional tasks to be done. The time and effort needed to expand computer education in the Newark School District will not diminish in future years. As a result of the work completed during the past year, a giant step has been taken, and the transition will be smoother and more orderly as the District moves toward a more refined program of computer education.

# BIBLIOGRAPHY

The documents in this bibliography have been secured and are currently on file as a "Computer Library" at Glasgow High School.

Anastasio, Ernest J., and Judith S. Morgan, Factors Inhibiting the Use of Computers in Instruction, Princeton, New Jersey: EDUCOM Interuniversity Communications Council, Inc., 1972.

Andrea, Richard V., Computer Programming and Related Mathematics, New York, New York: John Wiley and Sons, Inc., 1967.

Baker, Justine, The Computer in the School, Bloomington, Indiana: The Phi Delta Kappa Educational Foundation, 1975.

Ball, Marion J., What is a Computor?, New York, New York: Houghton Mifflin Co., 1972.

Brown, Dean, and Phyllis M. Cole, "The Classroom Microcomputer," Computer Decisions, Feb., 1975, P. 34.

Brown, Dean, "On Computers and Learning," Computer Decisions, May, 1974, P. 41.

Clayman, David, A Classroom Tool: Computer Solutions for Business and Industrial Problems, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1974.

Clayman, David, A Classroom Tool: Probability and Statistics on the Computer, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1974.

Computer Facilities for Mathematics Instruction, Washington, D.C.: National Council of Teachers of Mathematics, 1967.

CONTRACTING FOR COMPUTING: A Checklist of Terms and Clauses for Use in Contracting with Vendors for Computing Services, Princeton, New Jersey: EDUCOM Interuniversity Communications Council, Inc., 1973.

Crawford, Rudd A., and David H. Copp, Introduction to Computer Programming, Boston, Massachusetts: Houghton Mifflin Co., 1969.

Crowley, Thomas H., Understanding Computers, New York New York: McGraw-Hill Book Co., 1967.

Delaware Department of Public Instruction, A Report on a Survey of Job Opportunities for Graduates of Data Processing Instruction Programs in Delaware High Schools and Community Colleges, 1973.

Douglas, John H., "Computers 1: From Number Crunchers to Pocket Genies," Science News, Vol. 108, Sept. 6, 1975, P. 154.

Douglas, John H., "Computers 2: Brave New Components," Science News, Vol. 108, Sept. 13, 1975, P. 170.

Douglas, John H., "Computers 3: Beyond the Industrial Revolution," Science News, Vol. 108, Oct. 4, 1975, P. 220.

Dwyer, Thomas A., and Michael S. Kaufman, A Guided Tour of Computer Programming in BASIC, Boston, Massachusetts: Houghton Mifflin Co., 1973.

Forsythe, Alexandra I. et al., Computer Science: A First Course, New York, New York: John Wiley and Sons, Inc., 1969.

Forsythe, Alexandra I. et al, Computer Science: A Primer, New York, New York: John Wiley and Sons, Inc., 1969.

Forsythe, Alexandra I., et al, BASIC Language Programming, New York, New York: John Wiley and Sons, Inc., 1970.

Golden, Neal, Computer Programming in the BASIC Language, New York, New York: Harcourt, Brace and Jovanovich Corp., 1975.

Hagelbarger, David, and Saul Fingerman, Cardiac, New York, New York: Bell Telephone Laboratories, Inc., 1968.

Hatfield, Larry L., The Use of Computers in Mathematics Education Series: II. Computer Extended Problem Solving and Enquiry, Columbus, Ohio: ERIC Information Analysis Center for Science, Mathematics, and Environmental Education, 1973.

Herberg, Theodore, and James D. Bristol, *Elementary Mathematical Analysis*, Lexington, Massachusetts: D. C. Heath and Co., 1974.

Hickey, Albert E., "Using the Computer to Individualize Instruction and Save Money," *The Individualized Learning Letter - Special Report*, Feb., 1974.

Horwitz, Geoffrey B., and Michael D. Young, *Computer Operating Systems: Investment or Overhead?*, New York, New York: ANACOM, 1975.

Indiana Department of Public Instruction, *Math Guidelines for Indiana Schools K-12*, 1970.

Jacobs, Zeney P., et al, *Communicating with the Computer: Introductory Experiences, BASIC*, Rockleigh, New Jersey: Allyn and Bacon, Inc., 1975.

Johnson, David C., and Larry L. Hatfield, *Computer Assisted Mathematics Program First Course*, Oakland, New Jersey: Scott, Foresman and Co., 1968.

Johnson, David C., and John W. Walther, *Computer Assisted Mathematics Program Second Course*, Oakland, New Jersey: Scott Foresman and Co., 1969.

Johnson, David C., and Dale E. LaFrenz, *Computer Assisted Mathematics Program Algebra*, Oakland, New Jersey: Scott Foresman and Co., 1969.

Johnson, David C., and Pamela W. Katzman, *Computer Assisted Mathematic Program Geometry*, Oakland, New Jersey: Scott, Foresman and Co., 1969.

Johnson, David C., and Thomas E. Kieren, *Computer Assisted Mathematics Program Intermediate Mathematics*, Oakland, New Jersey: Scott, Foresman and Co., 1969.

Jones, Ben, *A Catalog of Non Print Materials Useful in Computer Related Instruction*, Eugene, Oregon: Lane County Intermediate School District, 1973.

Koch, Warren J., "Using Time Shared Computers in Secondary Schools: A Status Report," *NASSP Bulletin*, Vol. 56, No. 363, April, 1972, P. 46.

Koch, Warren J., "Basic Facts About Using the Computer in Instruction," The Education Digest, Vol. 38, March, 1973, P. 28.

Letson, John W., "Terminals Open the Door to Individualized Instruction," AEDS Monitor, Dec., 1971, P. 4.

Lundell, Jr., E. Drake, "Computers in Society: Impact Still Burning Question," Computer World, Vol. 185, No. 4151, Aug., 1974, P. 9.

Lynch, Robert E., and John R. Rice, Computers: Their Impact and Use, New York, New York: Holt,Rinehart and Winston, Inc., 1975.

Molnar, Andrew R., The Use of Computers in Mathematics Education Resource Series: I. Computer Innovations in Education, Columbus, Ohio : ERIC Information Analysis Center for Science, Mathematics, and Environmental Education, 1973.

Moursund, David, "Selecting Goals for an Introductory Computer Programming Course," Mathematics Teacher, Vol. 66, No. 7, Nov., 1973, P. 599.

My Computer Likes Me When I Speak Basic, Menlo Park, California: Dymax Corp., 1972.

Nolan, Richard L., Introduction to Computing Through the BASIC Language, 2nd, ed., New York, New York: Holt, Rinehart and Winston Co., 1974.

O'Neil, Carole and Mark Pytliki, Computers in Education: A Report of the Computer Services Branch, Canada: Province of Manitoba Department of Education, 1973.

Osborne, Adam, "The Potential Use of Mini-Computers in Education," Journal of Educational Data Processing, Vol. 8, No. 6, 1971, P. 1.

An Overview of the TICCIT Program, Washington, D.C.: The Mitre Corp., 1974.

Pratt, Harold, "Interactive Computer Simulation in Teaching Physics," National Science Supervisors Association Newsletter, Vol. 12, No. 3, Jan., 1975, P. 6.

Programming and Operations Lab I - Intermediate, Data Processing Technology, Miami, Florida: Dade County Public Schools, 1972.

Programming and Operations Lab II - Intermediate, Data Processing Technology, Miami, Florida: Dade County Public Schools, 1973.

Recommendations Regarding Computers in High School Education, Washington, D.C.: Conference Board of the Mathematical Sciences, 1972.

Rourke, Martha and Patrick W. Rourke, "So You Are Planning to Buy a Computer?," The Education Digest, Vol. 39, Nov., 1973, P. 30.

Sage, Edwin R., Problem-Solving with the Computer, Newburyport, Massachusetts: Entelek, Inc., 1969.

St. Cyr, Frederick, "Deriving Double-Duty Service From a Teaching Computer Installation," Business Education World, Nov.-Dec., 1974, P. 24.

Sass, Richard E., A Computer-Based Instructional Magagement Program for Classroom Use, Pittsburgh, Pennsylvania: Learning Research and Development Center, University of Pittsburgh, 1971.

Simms, Richard F., "Business Education and Computer Terminal," The Balance Sheet, Vol. 56, No. 2, Nov., 1974, P. 119.

Spencer, Donald D., A Guide to Teaching About Computers in Secondary Schools, Ormond Beach, Florida: Abacus Computer Corp., 1973.

Spencer, Donald D., Game Playing With Computers, Rochelle Park, New Jersey: Hayden Book Co., 1968.

Stein, Philip, "What Makes Minis Cheap?," Computer Decisions, Feb., 1975, P. 14.

System 2200: 2200 A/B Basic Programming Manual, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1974.

System 2200: 2200 A/B Reference Manual, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1974.

System 2200: Finance/Utilities/Games General Program Library, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1973.

System 2200: Finance/Utilities/Games General Programming Library Listings, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1973.

System 2200: General Utilities, Vol. 1, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1974.

System 2200: General Utilities, Vol. 2, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1974.

System 2200: Mathematics General Program Library, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1973.

System 2200: Mathematics General Program Library Listings, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1973.

System 2200: Programming Tools, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1974.

System 2200: Statistics/Engineering General Programming Library, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1973.

System 2200: Statistics/Engineering General Program Library Listings, Tewksbury, Massachusetts: Wang Laboratories, Inc., 1973.

Topics in Instructional Computing, ed. by Stuart D. Milner, Hanover, New Hampshire: SIGCUE, Kiewit Computation Center, 1975.

U. S. Office of Education, Computers and Careers: A Suggested Curriculum for Grades 9-12, 1973.

The Use of Computers in Mathematics Education Series: The Use of Computers in Mathematics Education: Bibliography, ed. by Marilyn N. Suydam, Columbus, Ohio: ERIC Information Analysis Center for Science, Mathematics, and Environmental Education, 1973.

*The Use of Computers in Secondary Schools*, ed. by Dudley L. Post, Newburyport, Massachusetts: Entelek Corp., 1970.

Ultal, William, et al, *Generative Computer-Assisted Instruction in Analytic Geometry*, Newburyport, Massachusetts: Entelek Corp., 1970.

Wagner, Gerald E., "Career Education via Data Processing," *The Balance Sheet*, Vol. 56, No. 5, Feb., 1975, P. 196.

Washbarn, Warren, "Data Processing in the High School Curriculum," *The Balance Sheet*, Vol. 56, No. 1, Oct., 1974, P. 61.

# THE DEVELOPMENT AND IMPLEMENTATION OF A DISTRICT COMPUTER EDUCATION PROGRAM

## APPENDIX A

### The Development of Goals and Objectives and a Long-Range Plan for Implementation

A1: Proposal for Computer Education Workshop - Phase I

A2: Proposal for Computer Education Workshop - Phase II

A3: Materials Relating to Formation of Phase I Workshop and List of Phase I Workshop Participants

A4: List of Sources Solicited for Potential Information

A5: Preliminary Goals and Objectives and Preliminary Long-Range Plan

A6: Preliminary Goals and Objectives Distribution List

A7: Long-Range Plan Included as a Part of Report to Deputy Superintendent

A8: List of Phase II Workshop Participants

A9: Computer Education Curriculum Guide - Interim Draft

A10: Computer Education Curriculum Guide - Distribution List

# APPENDIX A1

## Proposal for Computer Education Workshop - Phase I

FORM 1004 (Rev. 12/74)

**FUNDING REQUEST FOR PROGRAM AND STAFF DEVELOPMENT ACTIVITIES**

DATE SUBMITTED: January 23, 1975

mputer Education Workshop - Phase I

FOR OFFICE USE ONLY: NO 42
Approved: CYB
Date: [illegible]/15/75
Amount: $1,040—
Budget:
Initial Report Due: 5/15/75
Final Report Due: 11/1/75
Funds Revert: 5/15/75

NEWARK SCHOOL DISTRICT
Newark, Delaware

I. Person(s) Making Request F. Neil Walzl (Name) Administration Bldg. (School)

II. Type of Request: Check appropriate line in BOTH Column A and B

| Column A | Column B |
|---|---|
| ___ staff development | X school level |
| X program development | ___ district level |

III. Respond as carefully as possible to each of the following questions:

A. Statement of the problem to be considered;

B.
1. List the alternatives you have already attempted as a means of dealing with this problem;
2. List any activities that others in the district or elsewhere have already undertaken to deal with the problem;

C. List your major goals and objectives in the following areas:
1. Preparation of instructional materials, curriculum guides, course outlines, etc.;
2. What new or improved competencies do you expect teachers to have as a result of this activity;
3. What new or improved competencies do you expect students to have as a result of this activity;

D. Describe the activities to be carried out (include a copy of the program or an agenda, whichever is applicable);

E. Given the response to B, why is the activity you proposed in D needed?

F. Evaluation:
1. Describe the procedures for evaluating the activities (upon completion of the activity);
2. Describe the procedures you will use, and determine the date for final evaluation concerning:
    a. degree of success in achieving the aims listed in C;
    b. impact on the school program, including student and/or staff behavioral changes.

IV. Reports:

A. A report of your activities, including the evaluation results described in F 1, will be due one week after the activities are concluded.

B. A final report will be due upon completion of your final evaluation.

REQUESTS SUBMITTED ON FORM #1004 WILL BE CONSIDERED AS FOLLOWS:

Requests for fall inservice (up to Christmas break) will be reviewed the third Monday in September

Requests for winter inservice (after Christmas break) will be reviewed the third Monday in November

Requests for summer inservice will be reviewed the third Monday in March

V. BUDGET (include breakdown by categories, i.e., participants, resource persons, materials, etc.)

| Categories | Justification * | Amount ** |
|---|---|---|
| Personnel:<br>Leaders<br>**F. Neil Walzl** | **To provide leadership and resource materials** | -- |
| Participants<br>**10 district personnel** | **To produce the documents described in Part C** | -- |
| Resource Persons | | -- |
| Released time Substitutes<br>**Up to 40 teacher days @ $26/day** | **To provide release time for district teachers who will be serving on the committee** | 1,040.00 |
| Materials & Supplies | **Most materials have already been** gathered. | -- |
| Clerical and Other | **Will be handled by regular secretarial staff.** | -- |
| | TOTAL | **1,040.00** |

* Justification for each budget category should be presented in terms of the tasks to be accomplished, services rendered, etc., and in relation to the realization of the major goals and objectives, by number, listed in C.

** Participant amounts should reflect the state scale and the degree of involvement of the participants.

F. Neil Walzl
SIGNATURE OF PERSON REQUESTING FUNDS

1/23/76
DATE

Return in Duplicate to:

Director of Instruction
Administration Building

mjh
12/75

# COMPUTER EDUCATION WORKSHOP - PHASE 1

Part III.

A. Computer education has been offered in the Newark School District in various forms at the high school level for many years. However, the program has been hit or miss and highly dependent upon the availability of a staff member who has an interest in and who is willing to put forth the additional time necessary to conduct a program. Further, the programs vary widely from school to school because there is no established district plan for implementation and no established district goals and objectives.

With the installation of the computer system at Glasgow, the need for guidance in the form of a long range plan, goals and objectives, and course outlines become even more apparent. Thus, the problem is to develop the necessary documents at the district level for computer education.

B1. A solution for this problem has not been attempted before in the Newark District.

B2. Attempts are currently being made to contact persons in other districts to establish whether or not formal plans exist elsewhere which could be utilized.

C1. The major outcomes expected from this endeavor will be the production of the following:

a. A tentative district long range plan for computer education.

b. A preliminary set of goals and objectives for computer education for the Newark School District.

c. The identification of a sequence of courses for the district in computer education.

C2. It is expected that with the formal establishment of goals, objectives, etc., that teachers will be able to better utilize the computer in their daily instruction and increase the number of course offerings in computer education.

C3. Students will have the opportunity to develop an understanding of computer knowledge and skills necessary in the business and technical areas. Further, students will be able to develop the skills in mathematics and problem solving through flow charting, program coding, and on-line testing of computer programs.

D. The activity to be carried out will be to bring together ten persons for four days (not consecutively) to establish the necessary documents. One committee of five will be responsible for establishing a preliminary set of goals and objectives for the district while a second committee of five will be responsible for developing a long range implementation plan and the identification of a sequence of course offerings.

After these preliminary documents are developed, they will be distributed to a representative sample of teachers and administrators in the district for review and comments. It is expected that these preliminary documents along with the comments will be used as the input for a summer workshop at which final documents will be produced and course offerings will be fleshed out.

Tentative dates for the committee meetings are as follows:

| Date | Time | Location | Purpose |
|---|---|---|---|
| 2/19/75 | 3:15-4:15 | Glasgow High | Organizational Meeting |
| 2/27/75 | 8:00-4:00 | " " | Establishing & Formalizing preliminary plans |
| 3/13/75 | 8:00-4:00 | " " | " " |
| 3/20/75 | 8:00-4:00 | " " | " " |
| 4/17/75 | 8:00-4:00 | " " | Finalize preliminary plans for distribution to district personnel |

E. Because the necessary documents do not now exist in the district and preliminary investigations indicate few exist elsewhere, they will have to be developed locally.

F1. Documents produced will be evaluated by the Supervisor of Mathematics on the basis of content, style, and format.

F2. A follow-up survey will be conducted in the fall of 1975 to determine whether the documents are being utilized by teachers.

mhb
1/23/75

# APPENDIX A2

## Proposal for Computer Education Workshop - Phase II

FORM 1004 (Rev. 12/74)

FOR OFFICE USE ONLY: NO 43
Approved: CYB
Date: 3/5/75
Amount: $3,762.50
Budget:
Initial Report Due: 9/15/75
Final Report Due: 7/1/76
Funds Revert: 9/1/75

## FUNDING REQUEST FOR PROGRAM AND STAFF DEVELOPMENT ACTIVITIES

DATE SUBMITTED: **January 23, 1975**

**Computer Education Workshop - Phase II**

NEWARK SCHOOL DISTRICT
Newark, Delaware

I. Person(s) Making Request **F. Neil Walzl** (Name) **Administration Bldg.** (School)

II. Type of Request: Check appropriate line in BOTH Column A and B

| Column A | Column B |
|---|---|
| ___ staff development | X school level |
| X program development | ___ district level |

III. Respond as carefully as possible to each of the following questions:

A. Statement of the problem to be considered;

B. 1. List the alternatives you have already attempted as a means of dealing with this problem;
   2. List any activities that others in the district or elsewhere have already undertaken to deal with the problem;

C. List your major goals and objectives in the following areas:
   1. Preparation of instructional materials, curriculum guides, course outlines, etc.;
   2. What new or improved competencies do you expect teachers to have as a result of this activity;
   3. What new or improved competencies do you expect students to have as a result of this activity;

D. Describe the activities to be carried out (include a copy of the program or an agenda, whichever is applicable);

E. Given the response to B, why is the activity you proposed in D needed?

F. Evaluation:
   1. Describe the procedures for evaluating the activities (upon completion of the activity);
   2. Describe the procedures you will use, and determine the date for final evaluation concerning:
      a. degree of success in achieving the aims listed in C;
      b. impact on the school program, including student and/or staff behavioral changes.

IV. Reports:

A. A report of your activities, including the evaluation results described in F 1, will be due one week after the activities are concluded.

B. A final report will be due upon completion of your final evaluation.

**REQUESTS SUBMITTED ON FORM #1004 WILL BE CONSIDERED AS FOLLOWS:**

Requests for fall inservice (up to Christmas break) will be reviewed the third Monday in September

Requests for winter inservice (after Christmas break) will be reviewed the third Monday in November

Requests for summer inservice will be reviewed the third Monday in March

V. BUDGET (include breakdown by categories, i.e., participants, resource persons, materials, etc.)

| Categories | Justification * | Amount ** |
|---|---|---|
| Personnel:<br>Leaders<br>**1-75 hours** | **It is necessary that any writing team have a responsible person in charge who is knowledgeable about the subject.** | **$ 637.50*** |
| Participants<br>**5 teachers**<br>**75 hrs/teacher** | **A writing team is necessary to produce the documents.** | **2,625.00**** |
| Resource Persons<br>**District and State Supervisors of Mathematics** | **The supervisors will act as consultants and as members of the writing team.** | **--** |
| Released time Substitutes | **NA** | **--** |
| Materials & Supplies | **Paper, etc. will be necessary for production of the final documents. Also, it might be necessary to purchase some additional resource materials.** | **300.00** |
| Clerical and Other | **Secretarial assistance is necessary for final typing of documents produced.** | **300.00** |

*** Tentatively based on $8.50/hr.**
**** Tentatively based on $7.00/hr**

TOTAL ~~3,762.50~~

* Justification for each budget category should be presented in terms of the tasks to be accomplished, services rendered, etc., and in relation to the realization of the major goals and objectives, by number, listed in C.

** Participant amounts should reflect the state scale and the degree of involvement of the participants.

L. Neil Walz
SIGNATURE OF PERSON REQUESTING FUNDS

1/23/75
DATE

Return in Duplicate to:

Director of Instruction
Administration Building

mjh

## COMPUTER EDUCATION WORKSHOP - PHASE II

III. A. Goals, objectives, and course outlines for computer education courses for the Newark District do not now exist.

B1. Tentative plans have been submitted for developing preliminary documents during the spring of 1975.

B2. A search of the literature to locate sources in other districts is currently being conducted.

C1. The major expected outcomes will be the production of the following:

- a. A final district long range plan for computer education.
- b. A finalized set of goals and objectives for computer education for the Newark School District.
- c. Course guides for a series of computer education courses.

C2. & C3. These documents should provide district teachers with the necessary background to offer a computer education program which will enable students to accomplish the following:

- a. Develop an understanding of computer knowledge and skills necessary in the business and technical areas.
- b. Apply and extend mathematical skills using the computer and data processing techniques as the vehicle.
- c. Develop basic job entry skills and knowledge for the fields of data processing and computer programming.
- d. Develop positive attitudes about the role and function of computers and their operations.

D. A three week computer education curriculum development workshop will be held during the summer of 1975. Participants will consist of the supervisor of mathematics, one leader, and five teachers. This group will act as a writing team to produce the final documents listed in Part C.

E. A continuous block of time will be necessary to complete final documents.

F1. Final documents will be evaluated by the supervisor of mathematics on the basis of content, style, and format. The documents will then be submitted to the director of instruction for final review.

F2. In the fall, data will be gathered at the school level to determine the degree of student and teacher involvement in computer education. The number of students enrolled, the number of classes being conducted and planned for, the number of teachers involved, and the number of departments involved will all be considered.

Finally, an evaluation of student achievement will be conducted in the spring of 1976.

FNW/mhh
1/23/75

# APPENDIX A3

Materials Relating to Formation of Phase I Workshop

List of Phase I Workshop Participants

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE 19711
TELEPHONE 302 731-2000

ADMINISTRATION BUILDING
83 EAST MAIN STREET

February 7, 1975

Dear ____________________:

In order to offer a program in computer education in the Newark School District, which will best serve the needs of the students and teachers, it will be necessary to develop district-wide goals, objectives, course guides, and a long-range plan for implementation.

As a first step, a committee is being formed to draft preliminary documents.

This committee will meet on the following days:

| Date | Time | Location | Purpose |
|---|---|---|---|
| 2/27/75 | 8:00-3:30 | Glasgow High<br>Room M-208 | Organizational meeting<br>Sub-Committee assignments<br>Review of existing documents |
| 3/13/75 | 8:00-3:30 | Glasgow High<br>Room M-208 | Preparation of preliminary documents |
| 3/20/75 | 8:00-3:30 | Glasgow High<br>Room M-208 | Preparation of preliminary documents |
| 4/17/75 | 8:00-3:30 | Glasgow High<br>Room M-208 | Preparation of preliminary documents |

Substitutes will be provided by the district. If you are willing to serve on this committee, please indicate on the bottom of this sheet and return to Neil Walzl, Administration Building.

Should you decide to participate, please bring any documents that you have that might be pertinent to the first meeting. If you have any questions, please call me on Ext. 2220.

Sincerely,

F. Neil Walzl

F. Neil Walzl
Supervisor of Mathematics

FNW:bap

---

I (do) (do not) wish to participate.

____________________
(NAME)

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

February 6, 1975

MEMORANDUM TO: Mr. Ott
Principal
Christiana High School

FROM: F. Neil Walzl fnw.
Supervisor of Mathematics

RE: Computer Education Workshop

Just a follow-up note to let you know that I have invited the following teachers from your building to participate in the workshop.

Jack Baldino
Steve Palmer
Frank Hagen

The dates are as follows:

February 27, 1975
March 13, 1975
March 20, 1975
April 17, 1975

Substitutes will be provided by the district.

FNWalzl:bap

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

February 6, 1975

MEMORANDUM TO: Mr. Comer
Associate Principal
Glasgow High School

FROM: F. Neil Walzl FNW.
Supervisor of Mathematics

RE: Computer Education Workshop

Just a follow-up note to let you know that I have invited the following teachers from your building to participate in this workshop:

Carl Jacobson
Ted Miller
Ronald Hull

The dates are as follows:

February 27, 1975
March 13, 1975
March 20, 1975
April 17, 1975

Substitutes will be provided by the district.

FNWalzl:bap

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

February 6, 1975

MEMORANDUM TO: Mr. Musselman
Associate Principal
Newark High School

FROM: F. Neil Walzl fnw.
Supervisor of Mathematics

RE: Computer Education Workshop

Just a follow-up note to let you know that I have invited the following teachers from your building to participate in this workshop.

Lisa Bartle
Don Allen
Rebecca Feikls

The dates are as follows:

February 27, 1975
March 13, 1975
March 20, 1975
April 17, 1975

Substitutes will be provided by the district.

FNWalzl:bap

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

March 17, 1975

MEMORANDUM TO: Mr. Gilmore Ott
Christiana High School

FROM: F. Neil Walzl
Supervisor of Mathematics

RE: Attendance of Mr. Ed Stowell at
Computer Education Workshop

I have invited Mr. Stowell to attend our workshop meeting scheduled for April 17, 1975, at Glasgow High School. I will ask that a substitute authorization form be sent to you so you can arrange for a substitute for him.

If you have any questions, please call me. Thanks.

FNW:wap

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

April 11, 1975

MEMORANDUM TO: Computer Workshop Participants

FROM: F. Neil Walzl
Supervisor of Mathematics

RE:

Just a note to remind you about the computer workshop meeting next Thursday, April 17, 1975, at Glasgow High School.

If possible, please bring along a synopsis of any computer activities you or others in your building have conducted this year.

FNW:jjg

# COMPUTER EDUCATION WORKSHOP - PHASE I

## PARTICIPANT LIST

## SPRING, 1975

| NAME | SCHOOL | DEPARTMENT | DATES ATTENDED | | | |
|---|---|---|---|---|---|---|
| | | | 2/27 | 3/13 | 3/20 | 4/17 |
| John Baldino | Christiana | Math. | X | X | X | X |
| Frank Hagen | Christiana | Soc.Stud. | X | X | X | X |
| Steve Palmer | Christiana | Math. | X | X | X | X |
| Edwin Stowell* | Christiana | Science | | | | X |
| Kenneth Klimek | Christiana | Admin. | X | X | X | X |
| Rebecca Feikls | Newark | Bus. Educ. | X | X | | X |
| Lisa Bartle | Newark | Math. | X | X | X | X |
| Donald Allen | Newark | Science | X | X | X | |
| Thomas Concavage | Glasgow | Bus. Educ. | X | X | X | X |
| Ronald Hull | Glasgow | Science | X | X | X | X |
| Carl Jacobson | Glasgow | Math. | X | X | X | X |
| Ted Miller | Glasgow | Math. | X | X | X | X |
| Darrell Pelley* | Glasgow | Math. | | | | X |
| David Yens** | U of D | Educ. | | X | | X |
| Douglas Tilley** | Hodgson Vo.Tech. | Admin. | | | | X |
| F. Neil Walzl | Newark District | Math. | X | X | X | X |

*Denotes Substitute

**Denotes Guest

# APPENDIX A4

## List of Sources Solicited for Potential Information

February 26, 1975

Chairman, Mathematics Department
Einstein High School
Kensington, Maryland 20795

Dear Sir:

We are currently attempting to establish goals and objectives and formalize course guides for computer education at the high school level in the Newark School District.

I have been informed that your school currently offers courses in computer education. If you have any documents relating to these areas that you could share with me, it would be greatly appreciated. If there is any charge, let me know.

Sincerely,

F. Neil Walzl

F. Neil Walzl
Supervisor of Mathematics

FNW:bap

949-9011

**ALBERT EINSTEIN SENIOR HIGH SCHOOL**
11135 NEWPORT MILL ROAD KENSINGTON, MARYLAND 20795

March 25, 1975

Mr. F. Neil Walzl
Supervisor of Mathematics
Newark School District
P.O. Box 360
Newark, Delaware 19711

Dear Mr. Walzl:

In response to your inquiry regarding our courses in computer education I can offer you the following information. A one-semester course in computer mathematics which was scheduled to start this past February was canceled due to lack of enrollment. Because it is a new course in Montgomery County, specific objectives have not yet been completed. The general objectives, as described in the Montgomery County Program of Studies, Volume 5, are as follows:

> By the end of Computer Mathematics, most students should be able to:
>
> describe the historical highlights in the development of the computer
> name the main components in a computer configuration
> describe the functions of a computer and its peripheral equipment
> construct a flowchart for a given mathematics problem, commensurate with their backgrounds
> write a program in either BASIC or FORTRAN for a given mathematics problem, commensurate with their backgrounds
> diagnose and correct a program.

I hope that this information will prove useful in your attempt to establish a similar course in the Newark School District.

Sincerely,

Margarita S. Escatell

(Mrs.) Margarita S. Escatell
Mathematics Resource Teacher

## SCHOOLS AND ORGANIZATIONS CONTACTED REGARDING POSSIBLE INFORMATION RELATING TO COMPUTER EDUCATION

| Organization | Date |
|---|---|
| Mr. Lee Shoff<br>John Dickinson High School<br>Stanton School District<br>Stanton, Delaware | January 23, 1975 |
| Mr. George Brown<br>McKean High School<br>Marshallton-McKean High School<br>Wilmington, Delaware 19808 | January 23, 1975 |
| Dr. Isabel Miller<br>Conrad Senior High School<br>Conrad Area School District<br>Wilmington, Delaware 19804 | January 23, 1975 |
| Mrs. Rhoda Witlin<br>Concord High School<br>2501 Ebright Road<br>Wilmington, DE 19810 | January 23, 1975 |
| Mr. Gary E. Dunkleberger<br>Alexis I. duPont High School<br>50 Hillside Road<br>Greenville, DE 19807 | January 23, 1975 |
| Mr. David Van Wickle<br>Mount Pleasant High School<br>Mount Pleasant School District<br>Wilmington, Delaware | January 23, 1975 |
| Mr. Harry Kutch<br>William Penn High School<br>New Castle-Gunning Bedford School District<br>New Castle, Delaware 19720 | January 23, 1975 |
| Ms. Cynthia McGee<br>Delmar High School<br>Delmar School District<br>Delmar, Delaware 19940 | January 23, 1975 |
| Dr. Sylvia Charp<br>Director of Instructional Systems<br>Philadelphia School District<br>Benjamin Franklin Parkway and 21st<br>Philadelphia, PA 19100 | January 24, 1975 |

Dr. Allen Smith — February 3, 1975
ADCIS
University of Maine
56 Falmouth Street
Portland, Maine 04103

Dr. Thomas Dwyer — February 3, 1975
Project SOLO
Computer Science Department
University of Pittsburgh
Pittsburgh, Pennsylvania

Mr. Henry Peterson — February 7, 1975
Wayne, N.J. Computer Consortium
Board of Education
Wayne, New Jersey 07470

Sr. Ignatus, Chairman — February 7, 1975
Mathematics Department
St. Marks High School
Henderson Road
Wilmington, Delaware 19808

Director of Instructional Services — February 26, 1975
Education Service Center, Region IV
Houston, Texas 77000

Director of Instructional Services — February 26, 1975
Northwestern Educational Development Laboratory
Portland, Oregon 97200

Chairman, Computer Education Department — February 26, 1975
Lane Technical High School
Chicago, Illinois 60600

Director — February 26, 1975
South East Regional Computer Center
Atlanta Public Schools
Atlanta, Georgia 30300

Chairman — April 16, 1975
Computer Education Department
Admiral Peary Vocational-Technical High School
Ebensburg, Pennsylvania 15931

SIGCUE — April 16, 1975
Kiewit Computation Center
Dartmouth College
Hanover, N.H. 30755

Mr. Robert J. Seidel
S.S.P.A.C.E. Project Director
300 North Washington Street
Alexandria, Virginia 22314

May 2, 1975

mhh
10/21/75

# APPENDIX A5

## Preliminary Goals and Objectives and Preliminary Long-Range Plan

# COMPUTER GOALS

I. For All Students

A. Each student will be made aware of the capabilities and limitations of the computer.

B. Each student will be provided with a knowledge of the cultural and social impacts of computers and automation.

C. Each student will be acquainted with the kinds of job openings in data processing and the qualifications needed to fill them.

II. For All College-Bound And Business Education Students

A. Each student will be provided with "hands on" experiences with the computer in the following areas:

1. Using the computer for simulations
2. Using the computer to execute "canned" programs
3. Accessing a computer through at least one input device.

III. For All Business Education Students

A. Each student will be provided with a knowledge of data handling techniques and data processing machinery.

B. Each student will be acquainted with the terminology of automation.

IV. For All College-Bound Students

A. Each student will have experiences in simple programming as early as possible in school (preferably by the end of the 10th grade).

B. Each student will have the opportunity to use the computer as basic research tool.

V. For Social Science Oriented Students

A. Each student will be made aware of and have the opportunity to use the computer as a research tool.

VI. For Science and Mathematics Oriented College-Bound Students

A. Each student will be provided the opportunities which will enable him to handle sophisticated programming techniques.

B. Each student will be provided the opportunities to apply computer programming techniques in other situations and subjects.

FNW:jjg
4/10/75

# COMPUTER OBJECTIVES (TO BE MET IN EXISTING COURSES)

1. State orally and in writing job descriptions of the studied computer-involved professions.
2. State in writing specific examples of computer usage in industry.
3. State in writing specific examples of computer usage in the business world.
4. State the opportunities of attending the computer course (data processing) offered at the County Vocational-Technical High Schools.
5. State the post-graduate schooling required for computer-related occupations.
6. List several accredited institutions for computer-related occupations.
7. Describe the on-the-job training program in use by area firms or industries.
8. State the computer-related job opportunities available tc a New Castle County resident as compared to other geographic locations.
9. Distinguish and compare the various ways of entry into the identified occupations.
10. State in writing several ways the computer will affect his career interests.
11. State the requirements, compensations, and advancement possibilities with career-related professions.

FNW/clp
4/10/75

## OBJECTIVES FOR 9 WEEKS COMPUTER EDUCATION COURSE

1. Demonstrate correct usage of the computer terminal through actual hands -on experience.
2. Translate simple arithmetic statements into computer language (Basic) and vice versa.
3. Write an elementary flowchart for a given problem.
4. Write a computer program, incorporating the correct Basic Statements, when given the necessary information.
5. Employ the computer's list of stored programs for work in related subject areas.
6. Operate a computer teletypewriter sender-reçeiver terminal, and use a variety of input-output devices.
7. List the limitations and strengths of the specific computer you use by noting what it can and what it cannot do.

FNW/clp
4/10/75

## OBJECTIVES FOR 18 WEEKS

## COMPUTER EDUCATION COURSE

1. Demonstrate correct usage of the computer terminal through actual hands-on experience.
2. Translate complex arithmetic statements into computer language (Basic) and vice versa.
3. Write a complex flowchart for a given problem.
4. Write a computer program, incorporating the correct Basic Statements, when given the necessary information.
5. Employ the computer's list of stored programs for work in related subject areas.
6. Operate a computer teletypewriter sender-receiver terminal, and use a variety of input-output devices.
7. List the limitations and strengths of the specific computer you use by noting what it can and what it cannot do.
8. Develop a proficiency in the compiler language BASIC in order to write and prepare programs to solve a variety of mathematical and scientific programs.
9. Develop an awareness of a computer system other than your own. Demonstrate how to access and use this other system.
10. The student will be able to compare and contrast computer programming languages.

11. The student will be introduced to the basics of documentation procedures.
12. The student will solve a problem which requires complex computer programming techniques.

mhh
4/10/75

## OBJECTIVES FOR 18 WEEKS INDEPENDENT STUDY
## COMPUTER EDUCATION COURSE

1. The student will be able to apply proper documentation techniques.
2. The student will be able to refine an existing computer program.
3. The student will be able to write a special program(s) for solving problems arising from any subject area.

mhh
4/10/75

## Goals for Computer Education Will Be

## Met in the Following Places in the Curriculum

I. Goals IA, IB, and IC for all students will be met in existing mathematics, science, and social studies courses.

II. Goals IIA, IVA, and IVB for college bound students will be met in a 9 weeks survey course in computer education.

III. Goals IIA, IIIA, and IIIB for business education students will be met in existing business education courses such as business machines, etc.

IV. Goal VA for social science oriented students will be met in existing social studies courses.

V. Goal VIA will be met in an 18 weeks course in computer education.

VI. Goal VIA (Extended) and VIB will be met in an 18 weeks independent study course in computer education.

FNW:jjg
4/10/75

DRAFT

# RECOMMENDATIONS

A. Establish a district-wide standing committee for computer education.

1. The Social Science, Mathematics, Science, and Business Education departments should be represented on this committee.

2. The committee would be responsible for reviewing (and recommendating changes when necessary) the district goals and objectives for computer education.

3. The committee would be responsible for investigating the latest computer hardware developments and recommending hardware changes to enable the goals and objectives to be accomplished better.

4. The committee would be responsible for determining the extent to which schools in the district want to be involved in computer education.

B. Establish the interrelationships between the Vocational Technical High School computer education program, DICE, and the computer education program in the comprehensive high schools as soon as possible.

C. Continue to participate in Project DELTA by supporting terminals at Christiana High and Newark High until such time as in-house (or other facilities) are capable of supporting all computer instructional activities in the district.

D. Install in-house computer systems at Christiana High and Newark High at the earliest possible time.

E. Install small in-house computer systems at each middle school at the earliest possible time.

F. Provide each elementary school with a programmable machine at the earliest possible time.

G. Install small in-house computers in two elementary schools at the earliest possible time.

H. Support DICE as a separate facility devoted to administrative functions.

I. Expand DICE to include time sharing capabilities for administrative functions.

J. Limit the initial computer facilities to be installed at the Vocational Technical High School to a small system which would be devoted to instruction.

K. Establish a position for computer education on the supplemental pay schedule. (For want of a better name this will be referred to as the position of "computer coach")

L. Establish a series of on-going computer education workshops which would be offered during the summer and during the academic year.

    1. Level 1 courses would be directed toward familiarizing teachers with computer operations and utilizing them within the curriculum (Personalizing canned materials, etc.)

    2. Level 2 courses would be directed toward updating and disseminating in-district and out-of-district accomplishments and developments.

FNW/clp
4/10/75

DRAFT - 4/10/75

## INSTALLATION COSTS FOR ALL INSTRUCTIONAL COMPUTER SYSTEMS EXCEPT VOCATIONAL-TECHNICAL SCHOOL

I. Phase-in Plan One (One Year)

A. 1975-76

1. Two computer systems for two high schools.

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | six 4K machines | $ 5,400 | $32,400 |
| b. | two 12K machines | 11,600 | 23,200 |
| c. | two disks | 6,000 | 12,000 |
| d. | two printers | 1,800 | 3,600 |
| | Overall Total | | $71,200 |

2. Four computer systems for middle schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | four 4K machines | $ 5,400 | $21,600 |
| | Overall Total | | $21,600 |

3. Hardware for elementary schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | thirteen programmable machines | $ 2,500 | $32,500 |
| b. | two 4K machines | 5,400 | 10,800 |
| | Overall Total | | $43,300 |

| | |
|---|---|
| GRAND TOTAL | $136,100 |

## II. Phase-in Plan Two (3 years)

### A. 1975-76

1. Computer systems for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two 12K machines | $11,600 | $23,200 |
| b. | two 4K machines | 5,400 | 10,800 |
| c. | two printers | 1,800 | 3,600 |
| | Overall total | | $37,600 |

### B. 1976-77

1. Expansion equipment for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two disks | $ 6,000 | $12,000 |
| b. | four 4K machines | 5,400 | 21,600 |

2. Computer systems for middle schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |
| | Overall total | | $44,400 |

### C. 1977-78

1. Computer systems for middle schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |

2. Computer system for elementary schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |
| b. | thirteen programmable machines | 2,500 | 32,500 |
| | Overall total | | $54,100 |

GRAND TOTAL $136,100

## III. Phase-in Plan Three (3 years)

A. 1975-76

1. Computer systems for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two 8K machines | $ 7,000 | $14,000 |
| b. two printers | 1,800 | 3,600 |
| c. two 4K machines | 5,400 | 10,800 |
| Overall total | | $28,400 |

B. 1976-77

1. Expansion equipment for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two disks | $ 6,000 | $12,000 |
| b. two 4K machines | 5,400 | 10,800 |

2. Computer systems for middle schools

| | | |
|---|---|---|
| a. two 4K machines | $ 5,400 | $10,800 |
| Overall Total | | $33,600 |

C. 1977-78

1. Computer systems for middle schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two 4K machines | $ 5,400 | $10,800 |

2. Computer systems for elementary schools

| | | |
|---|---|---|
| a. two 4K machines | $ 5,400 | $10,800 |
| b. four programmable machines | 2,500 | 10,000 |
| Overall total | | $31,600 |

GRAND TOTAL $93,600

## IV. Phase-in Plan Four (4 years)

A. 1975-76

1. Computer systems for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two 8K machines | $ 7,000 | $14,000 |
| b. | two printers | 1,800 | 3,600 |
| | Overall total | | $17,600 |

B. 1976-77

1. Expansion equipment for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two disks | $ 6,000 | $12,000 |
| b. | two 4K machines | 5,400 | 10,800 |
| | Overall total | | $22,800 |

C. 1977-78

1. Expansion equipment for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |

2. Computer systems for middle schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |
| | Overall total | | $21,600 |

D. 1978-79

1. Expansion equipment for high schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |

2. Computer systems for middle schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |

3. Computer systems for elementary schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |
| | Overall total | | $32,400 |

GRAND TOTAL $94,400

V. Phase-in Plan Five (4 years)

A. 1975-76

1. Computer systems for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two 8K machines | $ 7,000 | $14,000 |
| b. two printers | 1,800 | 3,600 |
| Overall total | | $17,600 |

B. 1976-77

1. Expansion equipment for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two disks | $ 6,000 | $12,000 |
| b. two 4K machines | 5,400 | 10,800 |
| Overall total | | $22,800 |

C. 1977-78

1. Expansion equipment for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two 4K machines | $ 5,400 | $10,800 |
| 2. Computer systems for middle schools | | |
| a. one 4K machine | $ 5,400 | $ 5,400 |
| Overall total | | $16,200 |

D. 1978-79

| | | |
|---|---|---|
| 1. Computer systems for middle schools | | |
| a. one 4K machine | $ 5,400 | $ 5,400 |
| 2. Computer systems for elementary schools | | |
| a. one 4K machine | $ 5,400 | $ 5,400 |
| Overall total | | $10,800 |

GRAND TOTAL $67,400

mhh

# APPENDIX A6

## Preliminary Goals and Objectives Distribution List

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

April 24, 1975

MEMORANDUM TO: Secondary Teachers

FROM: F. Neil Walzl
Supervisor of Mathematics

RE: Computer Goals and Objectives

Attached you will find a copy of Computer Goals and Objectives which are in a draft form. I would like you to react to these goals and objectives and make any changes you feel are necessary. If you think there are goals and/or objectives which are missing, please write them on the sheets that are attached. Please send any comments you might have about these goals and objectives to me at the Administration Building. We welcome your comments as we would like to complete a final draft of the goals and objectives for the district during this summer.

Thank you.

FNW:bap
Attachments

# PRELIMINARY GOALS AND OBJECTIVES
## DISTRIBUTION LIST

April 24, 1975

| | NAME | SCHOOL | DEPARTMENT |
|---|---|---|---|
| 1. | Carol Brown | Central Middle | Mathematics |
| 2. | James Owens | Central Middle | Mathematics |
| 3. | Barbara Jones | Gauger Middle | Mathematics |
| 4. | George Cressman | Gauger Middle | Mathematics |
| 5. | Cathy Waller | Gauger Middle | Social Studies |
| 6. | Jack Chelucci | Ogletown Middle | Mathematics |
| 7. | Raymond Kendzierski | Ogletown Middle | Science |
| 8. | Johnnye Sue Baker | Shue Middle School | Social Studies |
| 9. | Ken Brown | Shue Middle School | Mathematics |
| 10. | Anna Billey | Christiana High School | Language Arts |
| 11. | James Halligan | Christiana High School | Language Arts |
| 12. | William Adkins | Christiana High School | Mathematics |
| 13. | Howard Gerken | Christiana High School | Mathematics |
| 14. | Thomas Mahler | Christiana High School | Mathematics |
| 15. | William Murphy | Christiana High School | Mathematics |
| 16. | Mary Pritchett | Christiana High School | Mathematics |
| 17. | Franklin Sykes | Christiana High School | Mathematics |
| 18. | Sharon Allen | Christiana High School | Science |
| 19. | Robert Derickson | Christiana High School | Science |
| 20. | Harry Dillner | Christiana High School | Science |
| 21. | Carol Ellis | Christiana High School | Science |
| 22. | Leonard Ference | Christiana High School | Science |
| 23. | Ralph Graham | Christiana High School | Science |
| 24. | Terry Smith | Christiana High School | Science |
| 25. | Robert Hable | Christiana High School | Social Science |
| 26. | James Owen | Christiana High School | Social Science |
| 27. | Joan Caldwell | Christiana High School | Business Education |
| 28. | Elinor Short | Christiana High School | Business Education |
| 29. | Elaine Matt | Glasgow High School | Social Sciences |
| 30. | Carol Brown | Glasgow High School | Mathematics |
| 31. | Nicola Fera | Glasgow High School | Mathematics |
| 32. | Joan Fessler | Glasgow High School | Mathematics |
| 33. | Dock Williams | Glasgow High School | Mathematics |
| 34. | Janice Yorke | Glasgow High School | Mathematics |
| 35. | Edward Davis | Glasgow High School | Science |
| 36. | James Pletcher | Glasgow High School | Science |
| 37. | John Reinholt | Glasgow High School | Science |
| 38. | Verne Wood | Glasgow High School | Science |
| 39. | Rosemarie Bakos | Glasgow High School | Business Education |
| 40. | Rosie Mickey | Glasgow High School | Business Education |
| 41. | Hubert Prettyman | Glasgow High School | Business Education |
| 42. | Mary Hynson | Newark High School | Language Arts |
| 43. | George T. Alderson | Newark High School | Mathematics |
| 44. | Francis Fulghum | Newark High School | Mathematics |
| 45. | George Hart | Newark High School | Mathematics |
| 46. | Barbara Kendall | Newark High School | Mathematics |
| 47. | Dorothy Munroe | Newark High School | Mathematics |
| 48. | Ricky Reedy | Newark High School | Mathematics |
| 49. | Richard Skovronski | Newark High School | Mathematics |
| 50. | Mary Ann Pelley | Newark High School | Mathematics |

Distribution List (Cont'd.)
Page 2

| | NAME | SCHOOL | DEPARTMENT |
|---|---|---|---|
| 51. | Arthur Whittaker | Newark High School | Mathematics |
| 52. | Stephen Fisher | Newark High School | Mathematics |
| 53. | Clair Clawson | Newark High School | Science |
| 54. | Eugene Hester | Newark High School | Science |
| 55. | Constance Dunbar | Newark High School | Science |
| 56. | William Johnstone | Newark High School | Science |
| 57. | William Sokol | Newark High School | Science |
| 58. | Donald Allen | Newark High School | Science |
| 59. | Wayne Hill | Newark High School | Social Sciences |
| 60. | Charlene Coder | Newark High School | Business Education |
| 61. | Grant Ewell | Newark High School | Business Education |
| 62. | David Nichols | Newark High School | Business Education |
| 63. | J. Robert Parsons | Newark High School | Business Education |

mhh
10/21/75

# APPENDIX A7

## Long-Range Plan Included as a Part of a Report to Deputy Superintendent

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

May 8, 1975

MEMORANDUM TO: Dr. John Allen

FROM: F. Neil Walzl *fnw*

RE: Report on Computer Education in the Newark School District

Attached are two copies of a report on computer education activities conducted in the district during the 1974-75 school year. Appendix A contains the recommendations, preliminary goals, preliminary objectives, and hardware phase-in plans which the computer education committee compiled. I have covered Mr. Freidly and Mrs. Bonney with a copy. If you would like to discuss this paper, please let me know.

Thanks.

FNW/clp

Attachments

# REPORT ON THE STATUS OF COMPUTER EDUCATION IN THE NEWARK SCHOOL DISTRICT, 1974-75
## FUTURE RECOMMENDATIONS

## I. Existing Hardware

During the 1974-75 school year, time sharing terminals were located at Christiana and Newark High Schools. Glasgow High School's equipment consists of three 4K Wang 2200B computers and one 12K Wang 2200B computer with a disk and a thermal printer.

## II. Utilization of Existing Equipment at Christiana High School and Newark High School

The terminals at Christiana and Newark were utilized in the following ways:

1. Computer knowledge courses
2. Problem solving in mathematics & science courses
3. Simulations in science courses
4. Simulations in social studies courses
5. Equipment familiarization by business students.

The computer knowledge courses served approximately 25 students in the two schools. These students utilized the terminals extensively and many have reached a high level of sophistication with their programming skills.

Students in mathematics and science courses were exposed to the use of the terminal as a problem solving tool. This was usually done by the classroom teacher during a one or two week period in the fall of the year. Utilization in this mode was greater in this area of science than mathematics due to the large number of programs devoted to that area available on the systems library. Approximately 300 students were reached in this manner. Unfortunately, not all classes had equal exposure. Exposure and utilization ranged from extensive to none. There are several possible reasons for the uneveness of the exposure. They are: the limitations of the hardware available; teacher interest and background; and a lack of formal district and goals and objectives to guide the teachers. Each of these problems is currently being considered by the Computer Education Committee about which more will be said later in this report.

Simulations were used by students in the areas of biology, earth science, chemistry, physics, and various social studies courses. In this mode, students were confronted with a situation in which they could control certain variables. Examples of programs utilized in this mode include "POLUTE" and "MARKET." "POLUTE" is a program in biology in which students can control the variables of a pond while "MARKET" allows students to control the variables of a simulated economic system. In addition, social studies classes draw on the various data banks available for analysis and study. Approximately 300 students were reached in this manner.

Business education students in the business machines courses at Newark High were introduced to the terminal. While this is a natural place to accomplish this, only a small percentage of business education students take this course. Thus, efforts must be made to introduce more business education students to the uses of the computer and data processing.

## III. Utilization at Glasgow High School

Because the final decision to install at Glasgow High School wasn't made until August, 1974, and the actual installation didn't take place until October, 1974, no formal computer education courses were included in Glasgow's master schedule for the 1974-75 school year. Utilization of the equipment has been high however, and has been accomplished mainly through the introduction to programming through existing mathematics courses. 250 students were exposed in this manner. In addition, an informal course was offered by the Supervisor of Mathematics during the third quarter of the school year. Forty students elected to give up their free time to attend this course and many have become quite proficient in programming techniques.

A presentation was also made to the distributive education class and several periods were spent in familiarizing them with the uses of the computer.

Other uses include some attempts by teachers to utilize the system for classroom administrative purposes, the administration of make-up tests and review lessons, and simulations of various sorts.

Many students have also become familiar with the operation the computer by using the computerized games which are available.

For the 1975-76 school year, two courses were included in the master schedule. Approximately 100 students have elected these courses and it is hoped that in future years this number will increase.

## IV. Teacher Training Efforts

In August, 1974, the mathematics and science teachers of Glasgow High were given a brief training session on the equipment which was installed at the school. As a follow-up, the mathematics department chairman was sent to the five day intensive school conducted by Wang Laboratories in February, 1975.

A course in the uses of computers and introductory programming was conducted on the district-wide inservice days. Over 30 teachers attended this workshop and rated it as highly beneficial.

Preliminary plans have been made to conduct an additional workshop of a similiar nature during the summer of 1975.

## V. The Computer Education Committee

Funds were requested by the Supervisor of Mathematics to form a Computer Education Committee to formulate preliminary goals and objectives for computer education and to develop recommendations and a long range plan for the district. These funds were granted, and the committee was formed. Because computer education has been considered in the past as an activity of the mathematics department, committees of this type have usually not been particularly effective. Therefore, the committee chosen is composed of science, social studies, and business ed. teachers in addition to mathematics teachers.

This committee met for a full day on each of four different dates during February, March, and April 1975. The first day was devoted to establishing ground rules, definitions, and discussing various hardware configurations. Each person was charged with locating as many sources as possible which might yield information or data relating to the establishment of a computer education program in secondary schools. Over 50 letters were then written requesting any material which might be helpful.

The remaining three days were then devoted to compiling goals, objectives, and recommendations for the district. In addition, the committee is attempting to become familiar with latest developments in computer hardware and how it might be utilized in the secondary school program. One such effort is a visit the committee has scheduled on May 6, 1975, to work with the PLATO time sharing terminal located at the University of Delaware.

In addition to contacting potential sources of info related to computer education by letter, a search of ERIC documents submitted from 1972 to the present was conducted. To the committees' dismay, this search yielded only two documents which were useful.

The committee also touched bases with Mr. Doug Tilley, Principal of the Hodgson Vocational Technical School about his plans for the computer education program there. In addition, Dr. David Yens, Computer Utilization Consultant for the College of Education, University of Delaware, was invited to spend a day with the committee. The interaction with Dr. Yens was considered by the committee to be extremely valuable.

At the completion of the four sessions, the committee had formulated a list of recommendations, hardware implementation plans (with prices based on the latest Wang Laboratories figures), and preliminary goals and objectives for computer education in the district. These documents are included in Appendix A. The goals and objectives have been distributed to 60 teachers in the district for their reaction and input for a group who will finalize them this summer.

## VI. Projected Activities

A workshop has been approved for the summer of 1975 to finalize the goals and objectives and course guides and to compile them in its approved district format.

A course is being prepared for students in computer education which will be offered through the extended year program. This experience should yield valuable information for future use.

A proposal has been submitted to offer a 15 hour workshop for 30 teachers in the utilization of computers and introductory programming.

## VII. Other Developments

Through efforts at the State level, a college and career guidance package will be available through Project DELTA next school year. Funding for terminals for this use is being sought through 509.

Also, at the State level, attempts are being made to have a matching fund type of line item for computer education hardware. Currently, this item is back in the budget.

A 509 project was submitted by Glasgow High for computer education. The project was rejected, but has since been resubmitted and has a much greater chance of being approved now.

## VIII. Summary & Recommendations

Overall, computer education and the uses of the computer in the instructional process in Newark District compares favorably with that which is being done elsewhere. More students are being exposed than is the case elsewhere. However, the computer is still being viewed by many in the district as an extension of the mathematics department. Also, equipment limitations at Christiana High and Newark High do not make expansion plans feasible. Further, with the installation of the guidance package, the systems in these two schools will not be sufficient to continue at the present level.

Thus, a strong recommendation must be made for in-house equipment at Christiana High and Newark High to maintain existing programs and for further expansion. Possible phase-in plans developed by the computer education committee to accomplish this are included in Appendix A.

A second recommendation is for the installation of a Project DELTA terminal at Glasgow for utilization of the guidance package. This would enable all secondary students to be able to access this most valuable guidance package.

The combination of a Project Delta terminal and inhouse equipment would enable the Newark District to meet the educational computer needs of the secondary students for many years to come.

FNW:bap
5/75

# APPENDIX A

# RECOMMENDATIONS OF THE COMPUTER EDUCATION COMMITTEE

## APRIL, 1975

Computers are here to stay. With over 100,000 computers in use in the United States today, and thousands more being used each month, it is safe to conclude that computers have become a permanent aspect of American life. The computer exercises such an important and widespread influence on our modern day society that it is essential that every well educated person know something about the potential benefits and changes of it.

Today, the majority of colleges and universities teach about and with computers. However, only about 30% of the students who graduate from high school go on to college. Thus, if we are to introduce computer training to the 70% who do not continue on to college, then we must educate them while they are in secondary school. Further, the 30% who do go on to higher education should have computer experiences as preliminary training for their post secondary education experiences.

With these thoughts in mind, the computer education committee makes the following recommendations.

A. Establish a district-wide standing committee for computer education.

1. The Social Science, Mathematics, Science and Business Education departments should be represented on this committee.
2. The committee would be responsible for reviewing (and recommendating changes when necessary) the district goals and objectives for computer education.
3. The committee would be responsible for investigating the latest computer hardware developments and recommending hardware changes to enable the goals and objectives to be accomplished better.
4. The committee would be responsible for determining the extent to which schools in the district want to be involved in computer education.

B. Establish the interrelationships between the Vocational Technical High School computer education program, DICE, and the computer education program in the comprehensive high schools as soon as possible.

C. Continue to participate in Project DELTA by supporting terminals at Christiana High, Glasgow High, and Newark High until such time as in-house (or other facilities) are capable of supporting all computer instructional activities in the district (including a Guidance package).

D. Install in-house computer systems at Christiana High and Newark High at the earliest possible time.

E. Install small in-house computer systems at each middle school at the earliest possible time.

F. Provide each elementary school with a programmable machine at the earliest possible time.

G. Install small in-house computers in two elementary schools at the earliest possible time.

H. Support DICE as a separate facility devoted to administrative functions.

I. Expand DICE to include time sharing capabilities for administrative functions.

J. Limit the initial computer facilities to be installed at the Vocational Technical High School to a small system which would be devoted to instruction.

K. Establish a position for each high school computer education on the supplemental pay schedule. (For want of a better name this will be referred to as the position of "computer coach")

L. Establish a series of on-going computer education workshops which would be offered during the summer and during the academic year.

    1. Level 1 courses would be directed toward familiarizing teachers with computer operations and utilizing them within the curriculum (Personalizing canned materials, etc.)

    2. Level 2 courses would be directed toward updating and disseminating in-district and out-of-district accomplishments and developments.

M. Offer Computers I, Computers II, and Computers III, (or equivalents) at Christiana High School and Newark High School.

## SUGGESTED TIME-LINE FOR IMPLEMENTATION OF COMPUTER ACTIVITIES

| | |
|---|---|
| Recommendation A | Immediately |
| Recommendation B | Immediately |
| Recommendation D | See attachment for suggested phase-in plans |
| Recommendation E | " " " |
| Recommendation F | " " " |
| Recommendation G | " " " |
| Recommendation I | September, 1977 |
| Recommendation K | September, 1975 |
| Recommendation L | 1975-76 school year |
| Recommendation M | 1975-76: Glasgow High School<br>1976-77; Christiana and Newark High Schools |

# COMPUTER GOALS

I. For All Students

   A. Each student will be made aware of the capabilities and limitations of the computer. Wherever possible, this will be provided via a "hands on" experience.

   B. Each student will be provided with a knowledge of the cultural and social impacts of computers and automation.

   C. Each student will be acquainted with the kinds of job openings in the computer field and the qualifications needed to fill them.

II. For All College-Bound And Business Education Students

   A. Each student will be provided with "hands on" experiences with the computer in the following areas:

      1. Using the computer for simulations
      2. Using the computer to execute "canned" programs
      3. Accessing a computer through at least one input device.

III. For All Business Education Students

   A. Each student will be provided with a knowledge of data handling techniques and data processing machinery.

   B. Each student will be acquainted with the terminology of automation.

IV. For All College-Bound Students

   A. Each student will have experiences in simple programming as early as possible in school (preferably by the end of the 10th grade) .

   B. Each student will have the opportunity to use the computer as basic research tool.

V. For Social Science Oriented Students

   A. Each student will be made aware of and have the opportunity to use the computer as a research tool.

VI. For Science and Mathematics Oriented College-Bound Students

   A. Each student will be provided the opportunities which will enable him to use sophisticated programming techniques.

   B. Each student will be provided the opportunities to apply computer programming techniques in other situations and subjects.

FNW/clp

## Goals for Computer Education Will Be Met in the Following Places in the Curriculum

I. Goals IA, IB, and IC for all students will be met in existing mathematics, science, and social studies courses.

II. Goals IIA, IVA, and IVB for college bound students will be met in a 9 weeks survey course in computer education.

III. Goals IIA, IIIA, and IIIB for business education students will be met in existing business education courses such as business machines, etc.

IV. Goal VA for social science oriented students will be met in existing social studies courses.

V. Goal VIA will be met in an 18 weeks course in computer education.

VI. Goal VIA (Extended) and VIB will be met in an 18 weeks independent study course in computer education.

## COMPUTER OBJECTIVES (TO BE MET IN EXISTING COURSES)

1. State orally and in writing job descriptions of the studied computer-involved professions.
2. State in writing specific examples of computer usage in industry.
3. State in writing specific examples of computer usage in the business world.
4. State the opportunities of attending the computer course (data processing) offered at the County Vocational-Technical High Schools.
5. State the post-graduate schooling required for computer-related occupations.
6. List several accredited institutions for computer-related occupations.
7. Describe the on-the-job training program in use by area firms or industries.
8. State the computer-related job opportunities available to a New Castle County resident as compared to other geographic locations.
9. Distinguish and compare the various ways of entry into the identified occupations.
10. State in writing several ways the computer will affect his career interests.
11. State the requirements, compensations, and advancement possibilities with career-related professions.

## OBJECTIVES FOR 9 WEEKS COMPUTER EDUCATION COURSE

1. Demonstrate correct usage of the computer terminal through actual hands -on experience.
2. Translate simple arithmetic statements into computer language (Basic) and vice versa.
3. Write an elementary flowchart for a given problem.
4. Write a computer program, incorporating the correct Basic Statements, when given the necessary information.
5. Employ the computer's list of stored programs for work in related subject areas.
6. Operate a computer teletypewriter sender-receiver terminal, and use a variety of input-output devices.
7. List the limitations and strengths of the specific computer you use by noting what it can and what it cannot do.

## OBJECTIVES FOR 18 WEEKS
## COMPUTER EDUCATION COURSE

1. Demonstrate correct usage of the computer terminal through actual hands-on experience.
2. Translate complex arithmetic statements into computer language (Basic) and vice versa.
3. Write a complex flowchart for a given problem.
4. Write a computer program, incorporating the correct Basic Statements, when given the necessary information.
5. Employ the computer's list of stored programs for work in related subject areas.
6. Operate a computer teletypewriter sender-receiver terminal, and use a variety of input-output devices.
7. List the limitations and strengths of the specific computer you use by noting what it can and what it cannot do.
8. Develop a proficiency in the compiler language BASIC in order to write and prepare programs to solve a variety of mathematical and scientific programs.
9. Develop an awareness of a computer system other than your own. Demonstrate how to access and use this other system.
10. The student will be able to compare and contrast computer programming languages.

11. The student will be introduced to the basics of documentation procedures.
12. The student will solve a problem which requires complex computer programming techniques.

mhh
4/10/75

## OBJECTIVES FOR 18 WEEKS INDEPENDENT STUDY
## COMPUTER EDUCATION COURSE

1. The student will be able to apply proper documentation techniques.
2. The student will be able to refine an existing computer program.
3. The student will be able to write a special program(s) for solving problems arising from any subject area.

mhh
4/10/75

## INSTALLATION COSTS FOR ALL INSTRUCTIONAL COMPUTER SYSTEMS EXCEPT VOCATIONAL-TECHNICAL SCHOOL

I. Phase-in Plan One (One Year)

A. 1975-76

1. Two computer systems for two high schools.

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | six 4K machines | $ 5,400 | $32,400 |
| b. | two 12K machines | 11,600 | 23,200 |
| c. | two disks | 6,000 | 12,000 |
| d. | two printers | 1,800 | 3,600 |
| | Overall Total | | $71,200 |

2. Four computer systems for middle schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | four 4K machines | $ 5,400 | $21,600 |
| | Overall Total | | $21,600 |

3. Hardware for elementary schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | thirteen programmable machines | $ 2,500 | $32,500 |
| b. | two 4K machines | 5,400 | 10,800 |
| | Overall Total | | $43,300 |

| | |
|---|---|
| GRAND TOTAL | $136,100 |

II. Phase-in Plan Two (3 years)

A. 1975-76

1. Computer systems for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two 12K machines | $11,600 | $23,200 |
| b. | two 4K machines | 5,400 | 10,800 |
| c. | two printers | 1,800 | 3,600 |
| | Overall total | | $37,600 |

B. 1976-77

1. Expansion equipment for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two disks | $ 6,000 | $12,000 |
| b. | four 4K machines | 5,400 | 21,600 |

2. Computer systems for middle schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |
| | Overall total | | $44,400 |

C. 1977-78

1. Computer systems for middle schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |

2. Computer system for elementary schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |
| b. | thirteen programmable machines | 2,500 | 32,500 |
| | Overall total | | $54,100 |

| | |
|---|---|
| GRAND TOTAL | $136,100 |

III. Phase-in Plan Three (3 years)

A. 1975-76

1. Computer systems for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two 8K machines | $ 7,000 | $14,000 |
| b. two printers | 1,800 | 3,600 |
| c. two 4K machines | 5,400 | 10,800 |
| Overall total | | $28,400 |

B. 1976-77

1. Expansion equipment for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two disks | $ 6,000 | $12,000 |
| b. two 4K machines | 5,400 | 10,800 |
| **2. Computer systems for middle schools** | | |
| a. two 4K machines | $ 5,400 | $10,800 |
| Overall Total | | $33,600 |

C. 1977-78

1. Computer systems for middle schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two 4K machines | $ 5,400 | $10,800 |
| **2. Computer systems for elementary schools** | | |
| a. two 4K machines | $ 5,400 | $10,800 |
| b. four programmable machines | 2,500 | 10,000 |
| Overall total | | $31,600 |

GRAND TOTAL $93,600

IV. Phase-in Plan Four (4 years)

A. 1975-76

1. Computer systems for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two 8K machines | $ 7,000 | $14,000 |
| b. | two printers | 1,800 | 3,600 |
| | Overall total | | $17,600 |

B. 1976-77

1. Expansion equipment for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two disks | $ 6,000 | $12,000 |
| b. | two 4K machines | 5,400 | 10,800 |
| | Overall total | | $22,800 |

C. 1977-78

1. Expansion equipment for two high schools

| | Hardware | Per Unit | Total |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |

2. Computer systems for middle schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |
| | Overall total | | $21,600 |

D. 1978-79

1. Expansion equipment for high schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |

2. Computer systems for middle schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |

3. Computer systems for elementary schools

| | | | |
|---|---|---|---|
| a. | two 4K machines | $ 5,400 | $10,800 |
| | Overall total | | $32,400 |

GRAND TOTAL $94,400

## V. Phase-in Plan Five (4 years)

### A. 1975-76

1. Computer systems for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two 8K machines | $ 7,000 | $14,000 |
| b. two printers | 1,800 | 3,600 |
| Overall total | | $17,600 |

### B. 1976-77

1. Expansion equipment for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two disks | $ 6,000 | $12,000 |
| b. two 4K machines | 5,400 | 10,800 |
| Overall total | | $22,800 |

### C. 1977-78

1. Expansion equipment for two high schools

| Hardware | Per Unit | Total |
|---|---|---|
| a. two 4K machines | $ 5,400 | $10,800 |

2. Computer systems for middle schools

| | | |
|---|---|---|
| a. one 4K machine | $ 5,400 | $ 5,400 |
| Overall total | | $16,200 |

### D. 1978-79

1. Computer systems for middle schools

| | | |
|---|---|---|
| a. one 4K machine | $ 5,400 | $ 5,400 |

2. Computer systems for elementary schools

| | | |
|---|---|---|
| a. one 4K machine | $ 5,400 | $ 5,400 |
| Overall total | | $10,800 |

| | |
|---|---|
| GRAND TOTAL | $67,400 |

mhh

# Prices For Wang Computer Systems As Of 4/8/75

## 2200 S

| | |
|---|---|
| 4K Processer | $ 2400.00 |
| CRT | 3000.00 |
| | 5400.00 |
| B-Verb Option | 800.00 |

## 2200 C

| | |
|---|---|
| 4K Processer | 5800.00 |
| 8K Module | 2800.00 |
| CRT | 3000.00 |
| Disk | 4500.00 |
| | 16100.00 |
| Thermal Printer | 1800.00 |
| Telecommunications Option<br>(Accoustic Coupler) | 900.00 |

## Additional Core Storage

| | |
|---|---|
| 4K Modules | $ 1600.00 |
| 8K Modules | 2800.00 |

## Proposed 2200C System Package

| | |
|---|---|
| 8K Processer<br>CRT<br>Disk | 10,000 to 11,000 |

Lease with intent to purchase plans

A. Five year plan (breakable) a percentage of purchase price. 50% of amount paid applied to purchase.

B. Three year plan (unbreakable) 40% - 40% - 30%

C. Two year plan (unbreakable) 50% - 50%

All Prices subject to 3 1/2% discount.

| | | |
|---|---|---|
| Electrical Maintenance | 6% | per year |
| Mechanical Maintenance | 11% (Thermal printer, Disk) | per year |

# APPENDIX A8

List of Phase II Workshop Participants

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

May 8, 1975

MEMORANDUM TO: Computer Goals, Objectives, and
Course Guides Writing Team

FROM: F. Neil Walzl FNW
Supervisor of Mathematics

RE: Summer Schedule

The dates for the writing team have been set for June 23 to July 12, inclusive, and the meeting place will be Glasgow High School.

Individual time assignments on these dates are as follows:

Mr. Darrell Pelley (leader) 9:00 a.m. to 4:00 p.m.

Full-Time

Mr. Tom Concavage - 9:00 a.m. to 4:00 p.m.
Mr. Ron Hull - 9:00 a.m. to 4:00 p.m.

Change to Part-Time
FNW

Part-Time

Mr. Frank Hagen - 1:00 p.m. to 4:00 p.m.
Mr. Carl Jacobson - 1:00 p.m. to 4:00 p.m.
Mr. Ted Miller - 1:00 p.m. to 4:00 p.m.
Ms. Lisa Bartle - 1:00 p.m. to 4:00 p.m.
Mr. Jack Baldino - 1:00 p.m. to 4:00 p.m.
Mr. Steve Palmer - 1:00 p.m. to 4:00 p.m.

FNW:bap

## COMPUTER GOALS & OBJECTIVES WORKSHOP - PAYROLL LIST

| NAME | SCHOOL | RATE | SUBMITTED 6/30/75 |  | SUBMITTED 7/15/75 |  | SUBMITTED 7/21/75 |  | TOTALS |  |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | hrs. | AMT. | hrs. | AMT. | hrs. | AMT. | hrs. | AMT. |
| Darrell Pelley (Leader) | GHS | 8.10 | 41 | 322.10 | 49 | 396.90 | 16 | 129.60 | 106 | 858.60 |
| Tom Concavage | GHS | 5.30 | 22 | 116.60 | 23 | 121.90 | - | - | 45 | 238.50 |
| Ronald Hull | GHS | 5.30 | 41 | 217.30 | 49 | 259.70 | - | - | 90 | 447.00 |
| Carl Jacobson | GHS | 5.30 | - | - | 28 | 148.40 | 16 | 86.40 | 44 | 234.80 |
| Ted Miller | GHS | 5.30 | 22 | 116.60 | 23 | 121.90 | 16 | 86.40 | 61 | 324.80 |
| Jack Baldino | CHS | 5.30 | 22 | 116.60 | 23 | 121.90 | - | - | 45 | 238.50 |
| Frank Hagen | CHS | 5.30 | 22 | 116.60 | 23 | 121.90 | - | - | 45 | 238.50 |
| Steve Palmer | CHS | 5.30 | - | - | 25 | 132.50 | 16 | 86.40 | 41 | 218.90 |
| Edwin Stowell | CHS | 5.30 | 22 | 116.60 | 8 | 42.40 | - | - | 30 | 159.00 |
| Liza Bartle | NHS | 5.30 | 22 | 116.60 | 23 | 121.90 | - | - | 45 | 238.50 |
| Rod Hart | NHS | 5.30 | - | - | - | - | 16 | 86.40 | 16 | 86.40 |
| TOTALS - |  |  |  | 1249.00 |  | 1589.40 |  | 475.20 |  | 3313.60 |

7/31/75

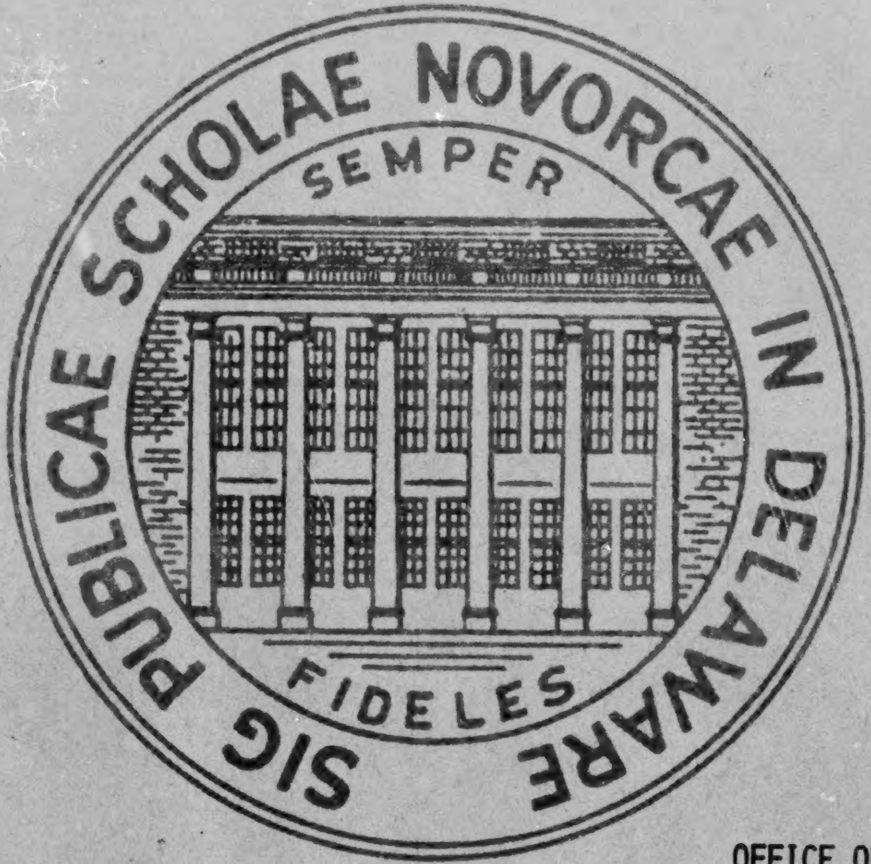
Marlene:
This is the final amount
for Phase II Workshop.
Ned.

# APPENDIX A9

## Computer Education Curriculum Guide - Interim Draft

COMPUTER EDUCATION
CURRICULUM GUIDE

Interim Draft



OFFICE OF INSTRUCTIONAL SERVICES
NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE 19711
DATE: July, 1975

# COMPUTER EDUCATION CURRICULUM GUIDE

July, 1975

NEWARK SCHOOL DISTRICT

NEWARK, DELAWARE

Dr. George V. Kirk, Superintendent
Dr. John E. Allen, Deputy Superintendent
Dr. Keith E. Stapley, Assistant Superintendent

BOARD OF EDUCATION

NEWARK SCHOOL DISTRICT

Mrs. Priscilla W. Crowder, President
Mr. William H. Clark, Vice-President
Mr. Randolph Lindell III
Mr. Richard B. Nelson
Mrs. Dorothy H. Ross
Dr. George V. Kirk, Secretary

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# FOREWORD

Computer education has been a part of the high school curriculum in the Newark School District for several years; however, no formal district direction has heretofore existed. With the addition of a third high school and expanded computer facilities in all high schools, the need for a formal guide has become apparent. Thus, in the summer of 1975, a committee of Newark staff members developed this curriculum guide as an aid for teachers and administrators when planning expanded computer education experiences for students.

This guide is presented to you in draft form. You are encouraged to record comments at appropriate points in the guide to aid in evaluating and improving its content. At the end of the 1975-76 school year, please forward your suggestions for improvement to the Computer Education Committee. Your comments, pro and con, will be most welcome and will help facilitate refinement and expansion of the guide.

Loren J. Thompson
Director of Instruction

# INTRODUCTION

A wide array of scientific, economic, social, and technical factors are reshaping our world, and with it, the course of modern education. One such technological development is the computer which is being utilized extensively and is playing a pervasive role in modern society. Banking, business, transportation, engineering, medicine, and social and scientific research are only a few of the many areas which are increasingly dependent upon the computer's speed in problem solving and capacity for handling vast amounts of data. In addition, the computer is fast becoming a significant tool in the administrative and instructional processes of education.

The President's Science Advisory Committee said that since the computer is such a valuable and versatile tool in society, students attending school in the 1970's who have not been exposed to knowledge about computers will be poorly prepared for the world of the 1980's and 1990's. Although most school students will not be computer technologists, the influence of the computer on their future is so important that they should be made aware of its nature and function.

Recognizing the fact that students of the Newark School District have a need for computer awareness, a committee of district staff members was appointed in 1975 to develop a guide for computer education. The purpose of the guide is to provide direction to teachers in meeting this need of students. Although the high schools may operate different programs, the guide provides for a unified computer education theme aimed toward common goals. As a secondary school staff member you should become familiar with the guide to determine which goal(s) are applicable in your present courses. When considering each of your courses the following flow chart may be helpful. (Flow Chart - Diagram #1). When considering your students, the diagram may be helpful. (Venn Diagram - Diagram #2) The boundaries represent minimal limits past which students should be encouraged to venture, not outer limits which restrict them.

A decimal outline system has been used in this guide with the numbers to the left of the decimal point representing the major goals. To the right of the decimal two significant places have been used. The tenths place has been assigned to the educational objectives and the hundredths place to the instructional objectives.

There are many ways each objective might be met and teachers are encouraged to modify and add to the suggested activites and strategies from their own experiences.

Credit for the production of this curriculum guide goes to several classroom teachers as well as other interested educators. Staff members who assisted in its preparation, either through writing or by participating in workshops include:

Donald Allen
John Baldino
Liza Bartle
Thomas Concavage
Rebecca Feikls
Frank Hagen
Ronald Hull
Carl Jacobson
Kenneth Klimek
Ted Miller
Steven Palmer
Darrell Pelley
Edwin Stowell

Consultants: William Geppert, State Supervisor
of Mathematics

F. Neil Walzl, Supervisor of
Mathematics

Dr. David Yens, University of Delaware

# FLOW CHART

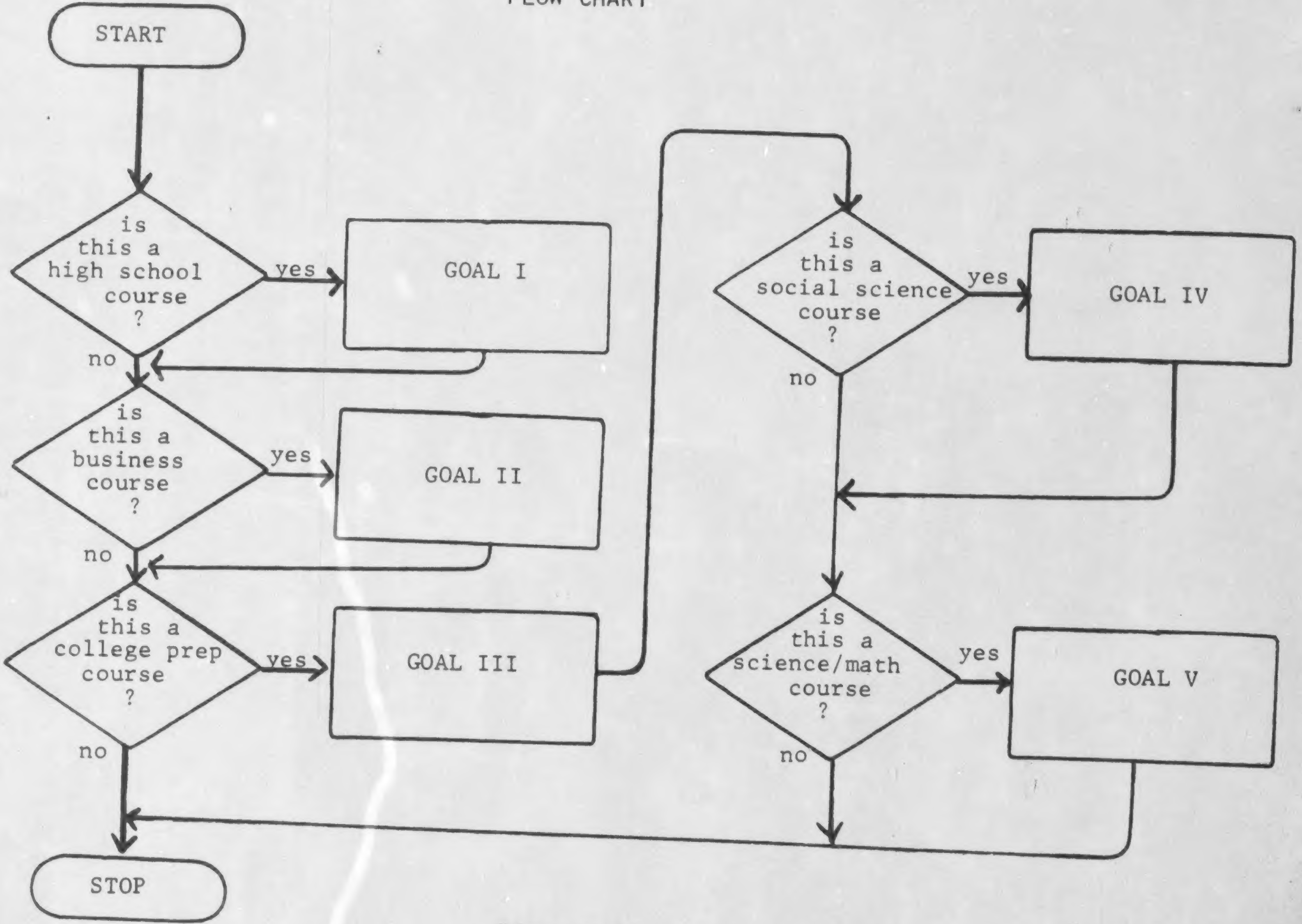

START
is this a high school course ?
yes
GOAL I
no
is this a business course ?
yes
GOAL II
no
is this a college prep course ?
yes
GOAL III
no
STOP
is this a social science course ?
yes
GOAL IV
no
is this a science/math course ?
yes
GOAL V
no

Diagram #1

## VENN DIAGRAM

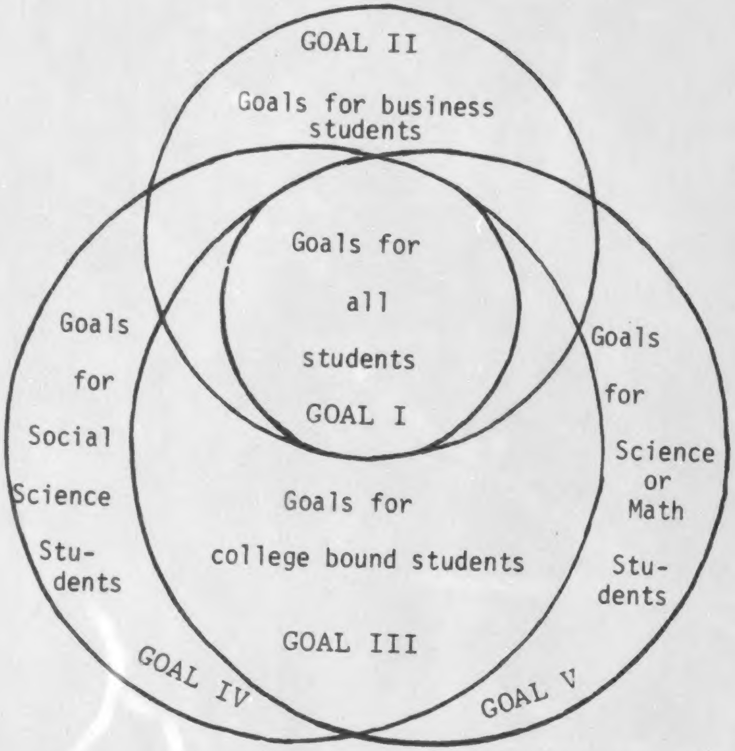

GOAL II
Goals for business students
Goals for all students
GOAL I
Goals for Social Science Students
Goals for Science or Math Students
Goals for college bound students
GOAL III
GOAL IV
GOAL V

Diagram #2

## GOALS FOR COMPUTER EDUCATION

GOAL NO. 1 ALL STUDENTS SHOULD BECOME AWARE OF THE COMPUTER ORIENTED SOCIETY IN WHICH THEY LIVE.

GOAL NO. 2 ALL BUSINESS STUDENTS SHOULD BE AWARE OF AND INVOLVED WITH COMPUTER APPLICATIONS IN THE BUSINESS FIELD.

GOAL NO. 3 ALL COLLEGE-BOUND STUDENTS SHOULD BE AWARE OF AND INVOLVED WITH COMPUTER APPLICATIONS IN ACADEMIC SUBJECT AREAS.

GOAL NO. 4 ALL SOCIAL SCIENCE ORIENTED COLLEGE-BOUND STUDENTS SHOULD BE AWARE OF AND INVOLVED WITH COMPUTER APPLICATIONS IN THE STUDY OF SOCIETY.

GOAL NO. 5 ALL SCIENCE AND MATHEMATICS ORIENTED COLLEGE-BOUND STUDENTS SHOULD BE INVOLVED IN-DEPTH WITH COMPUTER APPLICATIONS AND COMPUTER PROGRAMMING.

# CURRICULUM GUIDE
# FOR
# COMPUTER EDUCATION

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 1.00 All students should become aware of the computer oriented society in which they live. | | The objectives under Goal I should be met in existing courses in all subject areas and grade levels. These are not intended to replace course objectives; rather they should be met in conjunction with existing course content. |
| 1.10 Each student will be made aware of the utilization of computers in today's society. | | Teachers should continually seek opportunities to increase student awareness of computer utilization in their field. |
| 1.11 State specific examples of computer usage in industry.<br>1.12 State specific examples of computer usage in the business world.<br>1.13 State specific examples of computer usage in research. | Strategies:<br>Inquiry discussions<br>Guest speakers<br>Films<br>Student surveys or reports.<br>Topics:<br>Process control, quality control, sales and financial accounting, employee payroll, inventory control, student grade reports, student scheduling, student records, medical research, ecological research, space and earth technology research, language translation, literary works analysis. | Contact ERA for potential speakers. See Appendix A for annotated film list. |

| GOALS AND OBJECITVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 1.14 State specific limitations of computer usage. | | |
| 1.20 Each student will be provided with a knowledge of the cultural and social impacts of computers and automation. | | These objectives are especially appropriate to the social science curriculum. |
| 1.21 State several ways the computer affects the labor market. | Strategies:<br>Those listed under 1.10 | |
| 1.22 State several ways the computer affects the consumer. | Topics:<br>Automation replacing manual labor, computer revolution, need for increased skills for employment, cashless society, computerized check-out (Sears, Basco, grocery stores), reservation systems (airlines, Ticketron), establishment of data banks containing personal records. | |
| 1.23 State several ways the computer affects leisure time. | | |
| 1.24 State several ways the computer affects constitutional rights and depersonalization. | | |
| 1.30 Each student will be acquainted with computer related careers. | | All teachers should strive to make students aware of employment potential in the computer field. |
| 1.31 Identify and describe several computer involved occupations. | Strategies:<br>Those listed under 1.10 | Career guidance personnel could be an invaluable resource for this objective. |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 1.32 State compensations and advancement possibilities in several computer involved occupations. | | Refer to occupations such as law enforcement where a patrolman may use computer assistance in vehicle identification or a doctor might use computer analysis in diagnosis. |
| 1.33 Identify and describe several occupations in the computer industry. | | Refer to occupations in the design, manufacture, marketing, programming, operation and maintenance of computers. |
| 1.34 State compensations and advancement possibilities in several occupations in the computer industry. | | |
| 1.35 State various methods for entering computer related careers. | | |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 2.00 All business students should be aware of and involved with computer applications in the business world. | | Typing I, being the only common course of all business students, could be used to meet this goal and its objectives. All typing classes could take one week out of their regular classwork to familiarize themselves with computers. Only one typing class per week would be involved in the computer program. |
| 2.10 Each student will be acquainted with business applications of computers. | | |
| 2.11 Describe types of information that can be used by data processing systems. | Strategies:<br>Inquiry discussions<br>Guest lecture | Should be touched on in Typing I. |
| 2.12 Describe types of results obtainable from data processing systems. | Topics:<br>Payroll records - paychecks, inventory data - inventory control, charge slip - charge account bills. | |
| 2.20 Each student will be provided with knowledge of data processing machinery and terminology. | | |
| 2.21 Describe various input devices. | Strategies:<br>Inquiry discussion<br>Guest lecture | Should be touched on in Typing I and developed to a greater depth in Bookkeeping I and Business Machines. |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 2.22 Describe various output devices. | | |
| 2.23 Describe the processing unit. | | |
| 2.24 Describe various storage devices. | Film/filmstrip | See Appendix A, "All the Facts." |
| 2.30 Each student will be provided with knowledge of an available computer system through "hands-on" experiences. | | |
| 2.31 Identify limitations and capabilities of the specific computer used. | Strategies:<br>Hands-on experiences with computer. | |
| 2.32 Demonstrate correct usage of the computer through "hands-on" experiences. | Topics:<br>Computer commands: on-off, clear, load, run, select. | |
| 2.33 Employ existing simulation and problem solving programs. | Existing programs:<br>Fast<br>Market | |
| 2.34 Operate a variety of input/output devices. | | |
| | | As a follow up to the one week Typing I experience, all Typing I students could be involved in:<br>1. Field trips<br>A. DICE (Data Information Center for Education) |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
|  |  | B. Bank (24 hour teller, etc.)<br>C. Telephone Co.<br>D. I.B.M.<br>E. DuPont<br>F. U. of D.<br>2. Guest lecturer<br>A. Systems analyst from local business<br>3. Films/Filmstrips (See Appendix A) |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 3.00 All college-bound students should be aware of and involved with computer applications in academic subject areas. | | The objectives under Goal III should be met in existing college prep courses. Students aspiring to attain a greater knowledge of computers should be encouraged to enroll in computer courses. |
| 3.10 Each student will have an understanding of a variety of computer applications. | Strategies:<br>Inquiry discussions<br>Guest speakers<br>Field trips<br>Films<br>Student survey or reports<br>Computer demonstration | Contact ERA for potential speakers and field trip.<br>See Appendix A for annotated film list. |
| 3.11 Describe examples of computer applications. | Topics:<br>Student grades, records, scheduling, financial analysis, payrolls, inventory control (Basco, Sears), billing (phone, power, credit) process control, transportation (airline, Ticketron, rail freight scheduling), space flight control, telephone dialing system. | Although 3.11, 3.12, 3.13 are listed as separate objectives they are probably best met simultaneously. That is, discuss advantages and limitations of using the computer as each application is identified. |
| 3.12 Identify advantages of computer applications. | | |
| 3.13 Identify limitations of computer applications. | Non-thinking, does only what programmed to do, can work only on data given it, expense. | |
| 3.20 Each student will be provided with knowledge of computing machinery and terminology. | | |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 3.21 Describe various input devices. | Strategies:<br>Same as those listed under 3.10 | Discussion might well include historical development of devices. |
| 3.22 Describe various output devices. | | |
| 3.23 Describe the processing unit. | | |
| 3.24 Describe various storage devices. | | |
| 3.30 Each student will be provided with knowledge of an available computer system through "hands-on" experiences. | | |
| 3.31 Identify limitations and capabilities of the specific computer used. | | |
| 3.32 Demonstrate correct usage of the computer through "hands-on" experiences. | | See Appendix B. |
| 3.33 Employ existing simulation, problem solving and basic research programs. | | |
| 3.34 Operate a variety of input/output devices. | | |
| 3.40 Each student will have experiences in simple programming. | | |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 3.41 Write an elementary flowchart for a problem. | | |
| 3.42 Demonstrate a knowledge of a computer programming language. | | |
| 3.43 Write and execute a computer program to solve a specified problem. | | |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 4.00 All social science oriented college-bound students should be aware of and involved with computer applications in the study of society. | | Suggested for study in economics, political science and sociology courses. |
| 4.10 Each student will have an understanding of why and how computers are used as "tools" for the social sciences. | Strategies:<br>Discussion<br>Lecture<br>Problem solving<br>Brain storming<br>Film/filmstrip<br>Guest speakers | See Appendix A for annotated film list.<br>U. of Delaware professors |
| 4.11 Identify the role of the computer as a research and modeling tool in the social sciences. | Topics:<br>Improved speed and accuracy in analyzing social problems, ability to handle large amounts of information. | |
| 4.12 Describe computer applications for research and modeling in the social sciences. | Organizing and presenting demographic studies, mapping archeological dig sites, sales and revenue projection, hypothesis testing. | |
| 4.20 Each student will be provided with opportunities to use an available system for social science applications. | | |
| 4.21 Employ existing or original simulation and research programs. | Strategies:<br>Utilization of existing simulations and data base programs.<br>Development and execution of original problem solving programs. | |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
|  | Topics:<br>Existing programs<br>Economics: MARKET, ONIONS, LABOR, CROSS, CROSSE, BALANC, CIRFLW, CONSME, GNPSUM, INOUT<br>Political Science: POLSYS, POLICY, GVOTE, COMUNE, MASPAR, ELECT, ECPRESS<br>Sociology: ECPRESS | See Appendix B. |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 5.00 All science and mathematics oriented college-bound students should be involved in-depth with computer applications and computer programming. | | The objectives to Goal V should be met in existing upper division maths and science courses. However, these students should be encouraged to enroll in computer education courses to attain the depth of exposure desirable in an adequate pre-college experience. |
| 5.10 Each student will be provided opportunities to use sophisticated programming techniques. | | |
| 5.11 Translate a variety of mathematical expressions into computer language and vice versa. | | |
| 5.12 Formulate and refine algorithms to efficiently solve problems. | | |
| 5.13 Construct flowcharts for given algorithms. | Topics: both macro and micro flowcharts | Flowcharting is a good technique for teaching problem solving in many areas. |
| 5.14 Demonstrate a thorough knowledge of a programming language. | | I.E. Include advanced statements such as ON-GO TO, GO SUB, DEFFN<br>I.E. Use EDIT, TRACE, HALT/STEP |
| 5.15 Demonstrate an ability to execute and debug programs. | | |

| GOALS AND OBJECTIVES | SUGGESTED ACTIVITIES STRATEGIES/TOPICS | NOTES |
|---|---|---|
| 5.16 Employ appropriate documentation procedures. | | User and/or programmer documentation. |
| 5.20 Each student will be provided the opportunities to apply computer programming techniques in a variety of situations and subjects. | | These objectives would likely be met in independent study situations. |
| 5.21 Adapt existing computer programs. | | Students could tailor existing programs to meet needs of specific courses or teachers or modify them to run on other systems. |
| 5.22 Write a special program(s) for solving problems arising from any subject area. | | |
| 5.30 Each student will have an understanding of other computer systems and languages. | | |
| 5.31 Demonstrate an awareness of other computer systems. | Strategies:<br>Field trips | University of Delaware (Burroughs, PLATO, DELTA)<br>West Chester State<br>duPont<br>Hewlett-Packard |
| 5.32 Compare and contrast computer languages. | | |
| 5.33 Access other computer systems. | Hardware demonstrations. | Vendors<br>University of Delaware |

## APPENDIX A

This appendix contains a brief listing of films which could be used to meet various computer education goals and objectives. The rental price, if any, has probably gone up, and the source information is subject to change. Also, some sources may not serve our area. Therefore, users of this computer education guide are encouraged to forward any information pertaining to films found useful in the classroom to the computer education committee for inclusion in future revisions of the guide.

| Film Title and Description | Goal or Objective |
|---|---|
| A Customer is a Customer is a Customer 10-A<br>Motion picture. 30 min. Color. 16mm.<br>The story of NCR's Central Information File for banks. Designed to show how CIF affects banks and their customers.<br>Available from: NCRC. Rental: Free. | 2.00 |
| All the Facts 10-A<br>Motion picture. Color. 9 Min. 16 mm.<br>A case history of how one small businessman achieves the benefits of help by utilizing the services of a data processing center.<br>Available from: NCRC. Rental: Free. | 2.20 |
| America: On the Edge of Abundance..10-A<br>Motion picture. 60 min. B & W. 16 mm.<br>British television explores the far reaching economic and social consequences of the increasingly automated and computer-oriented society in the U.S.<br>Available from: OCEP. Rental: 8.40. | 1.2 |

Appendix A (Cont'd.)

Automation 10-A .................................................... 2.00
Motion picture. 28 min. B & W. 16 mm.
Under the guidance of automatic control research engineers, a survey is made of laboratories doing pioneer work in the development of new machines designed to assume some of the duties once performed only by humans.
Available from: UNIW. Rental: 6.00

The Bank 10-A .................................................... 2.00
Motion picture. 19 min. Color. 16 mm.
A detailed presentation of Demand Deposit Accounting using the Programmed Applications Library approach on the IBM 1419/1401 Tape System. It includes demonstrations on the 1401 system, 1210 Proof Inscriber and 1203 Unit Inscriber, showing all accounting management reports.
Available from: INBM. Rental: Free.

*A Better World 10-A* ............................................
Motion picture. 8 min. Color. 16 mm.
A film describing the influence of computers in our daily lives. A fast montage of applications covering a very broad range of subjects including education, medicine, traffic control on the ground and in the air, space research, law enforcement, and the general business community.
Available from: INBM. Rental: Free.

Careers in Computer and Data Processing 10-A .................. 1.30
Motion picture. 15 min. Color. 16 mm.
Produced for the Automation Institutes of America, this film explores the constantly growing needs of, as well as the variety of opportunities open in, Science, Business, and Industry for trained computer personnel. Further answered is the question of how today's young man or woman enters into this challenging computer field.
Available from: CDCO. Rental: Free.

Close Up 10-A .................................................. 1.10
Motion picture. 21 min. Color. 16 mm.
A documentary look at IBM, its people and their views of the technology with which they are working. A cinema verite film produced by Roman Kroitor, producer of "Labyrinth" for Expo 67. Included are glimpses into real life applications of computers in education, medicine, space and textile design.
Available from: INBM. Rental: Free

The Computer 2-6 .................................................. 1.10
Motion picture. 11 min. Si. Color. 16mm. Guide.
Provides an understanding of what kind of machine the computer is and how it works with information to help us in many areas of our modern world.
Available from: LANE. Rental: Free.

The Computer at Work. 9-12 .................................... 1.10
Motion picture. 12 min. Color 16mm.
Views the computer under actual working conditions - helping produce toys, improving instruction techniques in schools, helping to launch space ships, etc. Film offers the kind of realism that is so important in emphasizing computer studies and relating those studies to work.
Available from: MCID. Rental: Free.

Computer Flow Charts 7-12 .................................... 3.41- 5.13
Film loop. 8 mm. Si. Color. 4 min.
Organizes a simple problem into a flowchart similar to those used by computer programmers and solves the problem by following the flowchart.
Available from: BELT. Rental: Free.

Computers and Human Behavior 10-A ........................... 4.00
Motion picture. 29 min. Sd. Color. 16 mm.
Focus on behavior series. Research and experiments with electronic digital computers seeking to discover ways in which man thinks.
Available from: LIED OCEP. Rental: Free.

Appendix A (Cont'd.)

The Computer Revolution 7-A .................................. 1.10
Motion picture. 23 min. Sd. Color. 16 mm. Guide.
General introduction to the computer, emphasizing its present uses and its potential for the future.
Available from: LIED. Rental: Free.

Computer Systems in Personnel Accounting 10-A ............... 2.00
Motion picture. 23 min. Color. 16 mm.
This is the story of the acquisition and application of ADPS in the 4th U.S. Army in the area of personnel accounting.
Available from: USAR. Rental: Free.

Digital Computer Techniques: Computer logic 12-A ........... 3.40, 2.20
Motion picture. 13 min. Sd. Color. 16 mm.
Defines several meanings of logic, shows the difference between the decimal and binary number systems, and explains how binary numbers are constructed and how arithmetical operations are performed with them.
Available from: LIED. Rental: Free.

Digital Computer Techniques: Computer Units 12-A ............ 3.40, 2.20
Motion picture. 24 min. Sd. Color. 16 mm.
Describes the input unit and how it reads the problem data, the output unit and how it delivers problem solutions, the arithmetic unit and how it works, and the function of the control unit.
Available from: LIED. Rental: Free

Digital Computer Techniques: Introduction 12-A .............. 3.40, 2.20
Motion picture. 16 min. Sd. Color. 16 mm.
Explains historical origins of calculating devices; differences between analog and digital computers; and principal steps involved in solution of problems subjected to the computer.
Available from: LIED. Rental: Free.

Digital Computer Techniques - Logic Element Circuits 10-A..... 3.40, 2.20
Motion picture. 20 min. Color.
The film shows the application of solid-state electronic devices to computer circuits. A general discussion of AND and OR gates and their operation precedes the explanation of transistors. The use of transistors in the gates is covered. Shows the handling of binary information in the form of different voltages. The inverter, NOR gate and flip-flop circuitry is discussed. While the illustrations are good, the film should have an extensive supplementary elaboration by a scientific or technical person, or should be shown to an audience with that background.
Available from; USNA. Rental: Free.

Digital Computer Techniques: Programming 12-A .............. 3.40, 2.20
Motion picture. 14 min. Sd. Color 16mm.
Defines computer programming, explains how to analyze a problem: shows how a simple flow chart is prepared and how instructions to the computer are encoded in computer language.
Available from: LIED. Rental: Free.

Early Warning 10-A ........................................ 1.00
Motion picture. 25 min. Color. 16 mm.
The Veterans Administration Hospital, in Minneapolis, Minnesota, now has one of the most extensive computerized patient-monitoring setups in the nation. A Control Data 3300 computer, by performing separate functions simultaneously, is assisting the V.A. Hospital staff in saving lives. While the computer is analyzing monitored data from patients in the intensive care ward, it is also continually calculating, during surgery, the patient's cardian output and other vital information.
Available from: CDCO. Rental: Free.

Engine At the Door 10-A .................................. 1.00
Motion picture. 29 min. B & W. 16 mm.
Computer and the mind of man series. Discusses question of will machines ever run man. Points out that the wise and beneficial use of science and technology is man's responsibility.
Available from: OCEP. Rental: 5.00.

Appendix A (Cont'd.)

The Green Light 10-A .............................................. 2.00
Motion picture. 14 min. Color. 16 mm.
A contemporary look at the modern computerized office.
Comparison of old and new methods of gathering and storing information. Stresses the usefulness of learned skills in pursuing an office career.
Available from: BUEF. Rental: 14.00.

Guidance and Navigation 10-A .................................. 1.00
Motion picture. 6.5 min. 16 mm.
Presents a report of the intricate problems of guiding the American astronauts on their voyages and the ways in which these problems are solved. Shows the special techniques used to guide vehicles and spacecraft from earth to the moon and back.
Available from: NASA. Rental: Free.

How to Succeed Without Really Flying 10-A ..................... 1.00
Motion picture. 28 min. 16 mm.
Young FAA air traffic controllers, men and women, tell it like it is in this unusual behind-the-scenes look at one of aviation's most challenging careers. Actual controllers star in this film that describes what air traffic control offers as a profession, and how it provides rapid career advancement, professional status, high pay, and a rewarding sense of personal achievement. Especially recommended for television, high schools, colleges, and military separation centers.
Available from: FEAA. Rental: Free.

Impulse '90 10-A ............................................. 1.22, 2.00
Motion picture. 25 min. 16 mm.
A look at the cashless and checkless world of the future with a Universal Credit Card handling all spending and borrowing transactions using a computer.
Available from: MODT. Rental: Free.

Input/Output 7-12 ............................................ 3.20,2.20
Film loop. 8 mm. Si. Color. 4 min.
Shows several devices for conveying information into and

out of computers: punched cards, magnetic tape, microfilm and cathode ray tubes.
Available from: BELT. Rental: Free.

Introduction to Digital Computers 7-A .......................... 3.20, 2.20
Motion picture. 24 min. Color. 16 mm.
Shows what a computer is and how it works and what good it does. Animation explains input, control, arithmetic, memory and output--the five basic computer parts.
Available from: UVAC. Rental: Free.

It's Your Move 10-A ............................................ 2.00
Motion picture. 15 min. Color. 16 mm.
A film describing the Electronic Accounting System for automotive dealers. Scenes were filmed on location at the pilot installation and show the equipment in operation, the reports generated by the system, data center operations, and customer training.
Available from: NCRC. Rental: Free.

JOSS: Johnniac Open Shop System 10-A ........................... 5.30
Motion picture. 22 min. 15 mm.
Demonstrates an on-line time-shared system under development.
Available from: RANC. Rental: Free.

Man and Computer ... A Perspective 10-A ........................ 3.20
Motion picture. 20 min. Color. 16 mm.
A primer on some of the basic elements in data processing, such as input, output, storage and control. These are explained in detail in both live action and animation, with examples showing how they work and what functions they perform. In addition, the binary system is illustrated and defined in an understandable and graphic manner.
Available from: INBM. Rental: Free.

Memory Devices ................................................. 3.21
Motion picture. 28 min. Color. 16 mm.
Shows information storage devices used in modern computing machine memories. Explains how binary information is stored.
Available from: BELT. Rental: Free.

Appendix A (Cont'd.)

Modern Merchandise Management 10-A .......................... 2.00, 2.20
Motion picture. 23 min. Color. 16 mm.
An audio-visual report on the use of retail classification systems combined with edp.
Available from: NCAR. Rental: Free.

NCR 315 Data Processing System 10-A ........................ 5.31
Motion picture. 25 min. Color. 16 mm.
A complete description of the features and operation of the 315 computer system.
Available from: NCRC. Rental: Free

NCR 390 Data Processing System 10-A ........................ 5.31
Motion picture. 20 min. Color. 16 mm.
A complete description of the features and operation of this computer system.
Available from: NCRC . Rental: Free.

NCR 420-1 Optical Character Reader 10-A ...................... 5.31
Motion picture. 18 min. Color. 16 mm.
This film describes the Optical Reader and its operation, and demonstrates how the 420 functions in an EDP system.
Available from: NCRC. Rental: Free.

1999 (House of Tomorrow) 10-A ............................... 5.31
Motion picture. 35 min. Color.
Sponsored by Philco-Ford, the film has some commercial aspects. It shows a family of 3 and how their life might be lived in 1999, including education, health, recreation, occupation, and home life. Emphasizes the technological inventions which serve the people.
Available from: CINW, MCID. Rental: 5.00

Of Men and Machines 10-A .................................... 2.00
Motion picture. 30 min. B & W. 16 mm.
Investigates human behavior in highly-complex man-machine systems. Shows ways man processes information and handles the dynamics of information feedback between man and machines.
Available from: OCEP. Rental: 5.00

Appendix A (Cont'd.)

Pattern, Purpose, and Prospect 7-A .......................... 4.00
Motion picture. 25 min. Color.
The film describes what a computer is and what it can do, and compares it with human capabilities. The social impact is discussed, with emphasis on the computer as a tool in various applications. The functional units of a computer are described, especially several out-put devices. The ALSOL 60 language is used as an example of a computer language. Several computer applications are shown, including simulation. The film is English, and makes several references to items of English life possibly unfamiliar to Americans, such as the "6th form," the highest level in their secondary schools.
Available from: BRCG. Rental: Free.

Plan for Improvement 10-A .................................. 3.41
Motion picture. 20 min. Color. 16 mm.
Tells what the flow process chart is, why it is used, where and when it is made, and who should make it and how. Discusses each major part of the chart.
Available from: MODT. Rental: 12.00

Response to the Challenge 10-A .............................. 2.00
Motion picture. 18 min. Color. 16 mm.
Film discusses features of the 400 Electronic Accounting Machine.
Available from: NCRC. Rental: Free

Right of Privacy 10-A ....................................... 1.24
Motion picture. 59 min. Color. 16 mm.
Picture takes the stand that the proposed National Data Center is a danger to every American Citizen.
Available from: UCAL. Rental: 16.00

School Information Center 10-A .............................. 1.12
Motion picture. 11 min. Color.
This film contains discussion areas of application of data processing in schools. Included are student records, such as individual cumulative file, report cards, schedules, and class listings. Census, counselor's back-up information, and school district business applications are also covered.
Available from: INBM. Rental: Free.

Appendix A (Cont'd.)

Systems 10-A ........................................................ 1.12
Motion picture. 14 min. B & W. 16 mm.
Gives simple explanation of how complex computers serve government, science and industry. Problems range from airline reservation systems to ground control of manned space flight.
Available from: INBM. Rental: Free.

Time Sharing 10-A .................................................. 5.32
Motion picture. 30 min. B & W. 16 mm.
Describes time sharing program system developed at Systems Development Corp. It is a well done explanation, clear and straightforward. Time sharing is defined, along with a discussion of its value, the motivation for it, and objections of time sharing in problem solving. Aircraft interception is used as an example to show how a user enters and uses the system. The TINT language is defined.
Available from: WESE. Rental: Free.

2001 7-A ............................................................. 1.20
Motion picture. 25 min.
Walter Cronkite narrates this film showing the world of tomorrow and the way the computer is a help and an essential in the house.
Available from: RARI. Rental: Free

Universal Machines 10-A ......................................... 1.14
Motion picture. 30 min. 16 mm.
Computer and the mind of man series. The capability of the computer to do whatever man is capable of instructing it to do, limited only by man's ability to feed it with data and instructions.
Available from: LIED, OCEP. Rental: 5.00.

What's EDT 10-A .................................................. 3.22, 2.20
Motion picture. 13 min. Color. 16 mm.
Discusses basic principles of electronic data processing. Explains input, storage, processing and output of data.
Available from: INBM. Rental: Free.

Appendix A (Cont'd.)

You and the Computer 9-12 .................................... 2.10
Motion picture. 9 min. Color. 16 mm.
Uses live action and animation to focus on an item that is close to you, issuance of a paycheck. Terms, input, storage, calculation, output, and control are clearly defined and demonstrated.
Available from: MCID. Rental: Free.

Zero Hour 10-A .................................... 1.30
Motion picture. 15 min. Color. 16 mm.
The steps taken by several young people from their initial interest in the computer field as a career, which leads them to enrollment at a nearby Control Data Institute; followed by the various phases of classroom instruction with on-site computer training, to completion of their computer programming and technology courses, and the opportunities awaiting each graduate.
Available from: CDCO. Rental: Free.

Appendix A (Cont'd.)

## Sources for Materials

BELT Bell Telephone Laboratories
(Contact your local P.N.W.B. Office)

BUEF Business Education Films
5113 16th Street
Brooklyn, New York

CDCO Control Data Corp.
8100 S. 34th Ave.
Minneapolis, Minn. 55420

CINW Computer Instruction Network
4924 River Rd., N.
Salem, OR 97303

INBM International Business Machines
(Check with your local IBM Office)

LIED Lane County I.E.D.
Instructional Materials Center
748 Pearl Street
Eugene, OR 97301

MCID Multnomah Co., I.E.D.
220 S.E. 102nd
Portland, OR 97216

MODT Idustrial Management Society
C/O Modern Talking Film Service
P.C. Box 1005
Melrose Park, Illinois 60161

NASA Nasa Ames Research Center
Moffett Field, CA 94035

NCAR National Career Center
3839 White Plains Rd.
Bronx, N.Y. 10467

Appendix A (Cont'd.)

NCRC National Cash Register Co.
Audio Visual Services
Dayton, Ohio 45409

OCEP Oregon State A.V. Section
Division of Continuing Education
Coliseum 131
Corvallis, OR 97331

RANC Rand Corporation
1700 Main Street
Santa Monica, CA 90406

RARI Rarigs, Inc.
200 W. Mercer
Seattle, Washington

UCAL University of California
Extension Media Center
2223 Fulton St.
Berkeley, CA 94720

UNIW University of Iowa
Audio Visual Center
Div. of Extension & Univ. Services
Iowa City, Iowa 52240

USNA U.S. Navy Public Affairs Office
13th Naval District
U.S. Naval Air Station
Seattle, WA 98115

UVAC Univac Division
Sperry Rand Corp. Film Library
P. O. Box 500
Blue Bell, PA. 19422

WESE Western Electric Co.
Motion Picture Bureau
195 Broadway
New York, N.Y. 10007

# APPENDIX B

This appendix is provided to assist teachers in locating existing simulations relevant to specific courses to accomplish the following objectives: 2.31 to 2.34, 3.31 to 3.34, 4.21 and 5.21. The list of simulations and aids is being updated on a continuing basis and teachers should inquire about additional programs.

Refer to "WANG GENERAL PROGRAM LIBRARY" manuals for programs in mathematics, statistics, engineering and finances.

Available programs are listed alphabetically under subject areas.

## I. Business

FAST
This is a typing game which tests your speed and accuracy.

MARKET
This is a computer-based game of competition between two companies selling the same type of product. Allows the users to explore and discover appropriate marketing strategies with respect to production, pricing, and advertising.

## II. Computer Science

ANSWER
Answer is used to obtain responses to "gripe" messages.

DIRECT
This program can be used to obtain a catalog of the files on a user code.

EDIT
This is an all-purpose file editor, especially good for data files.

EDIT 8
This is a file editor, used for basic-plus files.

Appendix B (Cont'd.)

EDIT 20
This is a file editor, which can either find or replace all occurences of a given string.

FANNY
This program will punch files on paper-tape allowing the tape to be fan-folded.

GRIPE
This program permits the user to communicate with the staff at the center.

LIBRAR
This program aids the user in finding a program and can supply him with a list of all the available programs.

LOGIN
This program permits the user to "login" on the system. This program can only be run when a user types "Hello."

LOGOUT
This program allows a user to properly log-off the computer. This program can only be run when a user types "Bye."

PIP
This program is an all-purpose file handler.

QUOLST
This program tells the user his current disk quota and the system free count.

RESEQ
This program will resequence the line numbers of a program as specified by the user.

SYSTAT
This program gives the user statistics on the current status of the system.

Appendix B(Cont'd.)

**TTYSET**

This program is used to set terminal characteristics for the user's terminal.

## III. Foreign Language

**FRENCH**

Given the masculine singular form of any French adjective this program will give the feminine singular, masculine plural, and feminine plural forms of the adjective.

## IV. Language Arts

**EDBARD**

This program generates random poetry.

## V. Mathematics

### A. Algebra

**BOUNDS**

This program will find the interval which contains all the real roots of any polynomial equation up to the 20th degree.

**CURFIT**

This program performs a least squares curve fit to the following functions:

1) $Y = A + B(X)$
2) $Y = A + EXP (B + X)$
3) $Y = A + (X - B)$
4) $Y A + B / X$
5) $Y = 1 / (A + B + X)$
6) $Y = X / (A + B + X)$

**CXARTH**

This program will perform addition, subtraction, multiplication, and division on vectors expressed in either cartesian or polar systems.

**CXEXP**

This program will raise any real or complex number to any real or complex power.

Appendix B(Cont'd.)

**FNCTS**
This program will calculate the sin, cos, tan, sinh, cosh, and tanh of a complex number.

**GSIMEQ**
This program solves general simultaneous linear equations for any number of variables and equations.

**LINFIT**
This program computes the best linear fit and correlation for a set of independent variables to a dependent variable.

**POLY**
This program accepts X-Y data pairs and a polynomial degree and approximates a function to best fit the data.

**QUADRT**
This program determines the nature of the graph of the equation
$AX^2 + BXY + CY^2 + DX + EY + F = 0$.

**ROOTER**
This program finds the roots of a polynomial equation of one variable.

**SUB**
This is a game in which you are captain of a destroyer trying to sink an enemy submarine.

**SQRS**
This program expresses an integer as the sum of four squares.

**SQRT**
This program finds the square root of any positive numbers less than one million by "pinching" it within a smaller and smaller interval.

## B. Applied Math

**GINTLP**
This program will solve linear programming problems in which all variables are restricted to values of either one or zero.

Appendix B (Cont'd.)

## C. Calculus

**CVAREA**
This program evaluates the definite integral of F (X) from X=A to X=B by four different methods.

**INTEG**
This program finds the numeric integral of a function by Simpson's rule and the Romberg method.

**LIMSIN**
This program demonstrates that the limit of sin (x)/X, as X approaches 0, equals 1, provided that x is measured in radians.

**SLOPE**
This program will approximate the derivative at X=A in the interval (A, A+1) through secant slopes.

## D. General Math

**ARITH**
This program is a drill in one and two digit multiplication.

**CALC 2**
This program performs extended precision arithmetic operations on an imaginary calculator with a limit of 100 digits.

**CONVER**
This program performs English to metric and metric to English conversions.

**FACTRL**
This program will print out the factorial of a number.

**GCD**
This program finds the greatest common divisor of two or more numbers.

**PRIFA**
This program will find the prime factors of a number.

Appendix B (Cont'd.)

SAUCER
This is a game in which the user tries to shoot down the enemy spaceship.

SETS
This program finds the intersection and union of any two numerical sets.

## E. Geometry

P12
This program computes the area of a circle and "PI" by using the areas of inscribed and circumscribed polygons.

SAT
This program will solve for the remaining parts of a triangle given three parts.

PLOTTING
No description given.

FGRAPH
This program graphs from one to five functions simultaneously in an interval between two points.

PLOT 03
This program will plot sets of ordered pairs.

## F. Statistics

ANVAR 1
This program computes an analysis of variance table for a completely randomized one-way design.

ARGEOM
This program computes the geometric mean and standard deviation along with the arithmetic mean, median, and standard deviation of up to one hundred numbers.

CHISQR
This program computes chi-square statistics for any number of "m" by "n" contingency tables.

MINITA
A statistical computing program for students and researchers.

REGCOR
This program performs simple regression and correlation analysis on a series of observations of the values of two variables.

TTEST
This program calculates the mean and standard deviation for each of two samples and then compares the means using the assumption of equal variance, unequal variance or pairing of data.

## VI. Science

### A. Biology

DROS
This program determines the genetic characteristics of the offspring of a pair of drosophia flies.

ENZYME
This program discusses enzymatic reaction rates and conveys the idea that enzyme reactions are dependent upon environmental factors.

EVOLU
This program studies evolution by observing a population of light and dark pepper moths over a thirty year period.

GAMGN
This program is a review of the process of gametogenesis. applying it to the concept of dominant and recessive traits.

GENE 2
This program simulates a genetics lab in which you may study up to twenty different traits, each with up to twenty different variations.

Appendix B (Cont'd.)

HARDY
This program instructs the user about the Hardy-Weinberg principle and its applications.

PH
This program examines the theory that Ph specificity can be traced to the behavior of ionizable amino acids present at the active site.

### B. Biology Lab

LOCKEY
This program is a study of competitive inhibition of the enzyme acetylocholinesterase for application to the lock and key model.

MEMBR
This program looks at membrane characteristics by simulating an experiment on diffusion.

PHOSYN
This program investigates changes in the rate of photosynthesis when carbon dioxide and light intensity are varied.

### C. Chemistry

ATWT
This program calculates the atomic weight of an element.

AVOGA
This program calculates Avogadro's number.

EMPIR
This program calculates the empirical formula of a compound.

EQUIL
This program calculates the effects of concentration charges on two equilibrium systems.

KINET
This program calculates equilibrium concentrations.

MASSD
This program investigates and calculates the mass defect of an element.

PHPOH
This program computes the PH, POH, and percent dissociation for any weak monoprotic acid.

PRCNT
This program calculates the percent composition of a compound.

STOICH
This program solves mass-mass, mass-volume, and volume-volume problems.

## D. Chemistry Labs

ACBAT 1
This program calculates molarity of a base, molecular weight of an acid, and percent acetic acid in vinegar, acid, or base.

AGECU
This is an investigation into the area of electrolysis.

CALOR 1
Calorimetry experiments are simulated by permitting the user to enter masses and temperatures of two quantities of water.

CONMA 1
Calculations are done involving conservations of mass in a chemical change.

CUAGMO
The calculations are done for a laboratory experiment in electrolysis of a copper-silver nitrate reaction.

CUFEM 1
This program does the calculations for a lab which determines the mole ratio of iron and copper.

## Appendix B (Cont'd.)

FESCN
This program does calculations based upon the user's four ratios from the "Fescn" chemical equilibrium lab.

GASER 4
This program deals with calculations involving equal masses of three different gases.

HCMG 1
This program does calculations for the heat of combustion of magnesium.

HEAT 1
Calculations are done from the data collected from an experiment involving a water bath used to heat-sink a burning candle and melted wax.

HESS 1
This program calculates the results for a lab on the heat of reaction.

HYDRA 3
This program does calculations for a lab experiment dealing with hydrates.

ICER 1
This program is used in performing the calculations for a lab which determines the energy needed to melt ice.

MGHCL 1
This program considers the reaction of magnesium with hydrochloric acid.

MOLAR
This program calculates molarity by using data obtained from an acid-base titration.

### E. Earth Science

CLIMAT
This program gives the user practice in identifying climates and climatic patterns.

Appendix B (Cont'd.)

CLOUDS

This program tests the user's ability to solve problems related to the formation of cumuliform clouds.

SPHERE

This program solves spherical triangles that have their apex at the north pole and two other corners defined by their respective latitude and longitude.

SUNSET

This program determines sunrise and sunset times for a given week.

WATER

This program will show the user how to calculate a water budget.

WEATH

This program attempts to predict tomorrow's weather based on statistics from the preceding two days.

## F. Ecology

BUFLO

A simulation of the natural life cycle of the buffalo provides a context for the manipulation and study of population patterns and resource management.

LIFE

This is a game which simulates the rate of population growth of a biological community according to a set of simple genetic rules.

MALAR

The user attempts to control a malaria epidemic while studying the biological economic, social, political and ecological aspects of this world health problem

POLUT

The interaction between water and waste is simulated, providing a context within which the user can control specific variables which affect the quality of a water resource.

POP

This program allows exploration of three simple models of population growth. The primary species of study is the gypsy moth.

RATS

A simulation of the rat population in either a city or an apartment house with the environment and population control techniques entered by the user.

STERL

This program is a computer simulation designed to make possible an investigation of the effectiveness of two different methods of pest control: Pesticides and release of sterile male flies.

TAG

The user investigates the size of a wildlife population through the technique of tagging and recovery. The study population is the large-mouthed bass.

USPOP

This program is a flexible human population model. The user can investigate the effects of fertility, age of mother at birth of child, sex ratio of the offspring, and age-dependent mortality on population size and structure.

## G. Physics

BFIELD

This program investigates the magnetic fields produced by current carrying conductors.

BOHR

This program investigates the Bohr atom and how emission spectra are formed.

Appendix B (Cont'd.)

CHARGE
This program is a simulation of the Millikan oil drop experiment.

DECAY 1
Radioactive decay is treated pseudo-quantitatively by permitting the user to determine the approximate number of radioactive particles remaining after various times.

DECAY 2
This program will calculate half-life and mass of a radioactive sample.

EFIELD
This program calculates electric field strength.

KINERV
This program provides a review of kinematics, specifically projectile motion.

NEWTN 2
This program presents a problematic situation which requires repeated applications of Newton's Second Law

PHOTON
This program is designed to promote a better understanding of how energy levels are determined.

PRJTL
This program calculates the coordinates, vertical and horizontal velocities, and speed of a projectile.

REFLCT
An analogy is given for a light-ray reflected from a plane surface to demonstrate the "least-time" principle.

SCATR
This program simulates alpha particle scattering as demonstrated in the laboratory.

SNELL
Snell's Law is presented pictorially by plotting the path of a light ray as it crosses a boundary separating two different media.

SPACE
The effects of speed on orbital motion are demonstrated.

VFIELD
This program prints a picture of the relative potential field strengths in the region surrounding two point charges.

### H. Physics Lab

LENSES
This program will solve lens problems. It can solve for focal length, object distance, image distance, object size or image size.

PHOTEL
An experiment involving the photoelectric effect is simulated by the computer, to enable the user to develop a qualitative understanding of the phenomenon.

PLANK
This is a simulation of the experiment to determine Plank's Constant, threshold frequency and the work function of a metal.

SLITS
This is a simulation of Young's double-slit experiment demonstrating interference patterns for light. The computer permits greater flexibility for variation and investigation of parameters.

## VII. Social Science

### A. Economics

BALANC
This program emphasizes the important distinction between balance of trade and balance of payments.

Appendix B (Cont'd.)

CIRFLW
This program is a simulation of the circular flow of goods, services, and money between business and the consumer in a free enterprise economy without government control.

CONSMP
This program simulates economic depression and equilibrium as effects on consumption.

GNPSUM
This program prints a summary of figures for GNP, Consumption, Investment, and Government spending for a series of consecutive years.

INOUT
A hypothetical economy is divided into a certain number of industries, and is analyzed as to the inter-industry flows of goods and services over a period of time.

LABOR
This program is designed to simulate a strike and the ensuing bargaining between labor and management.

MARKET
This is a computer-based game of competition between two companies selling the same type of product. Allows the users to explore and discover appropriate marketing strategies with respect to production, pricing, and advertising.

ONIONS
The cobweb model for supply and demand is illustrated based upon current prices and quantity within the American onion market.

## B. General

ECPRES
This program is a computer system for selective retrieval and analysis of large date files in the social sciences.

ECPSUR
This program will put reformatted Opscan data into "Ecpres" file format.

ECPSUV
This program enables the user to create variable names and descriptions for an "Ecpres" study.

FORMAT
This program will put raw Opscan data into the format necessary for "Ecpsur."

POP
No description available.

USPOP
No description available.

Also see statistics list under mathematics.

### C. History

CIVWAR
The Civil War is relived with the user controlling the resources of the South and possibly commanding the Confederacy to a victory.

ELECT 1
Based on historic elections from 1828-1896, the user will allocate resources toward party, image, and policies in an effort to get his candidate elected.

ELECT 2
Based on historic elections from 1920-1968, the user will allocate resources toward party, image, and policies in an effort to get his candidate elected.

ELECT 3
The campaign for the presidency is divided into periods with the roles of candidate, campaign manager, special advisor, speechwriter, media expert, and fund-raiser, being assumed by the users who will attempt to allocate their resources in order to elect their candidate.

Appendix B (Cont'd.)

## D. Political Science and Law

COMUNE
This is a simulation in which you have been elected premier of a small communist island and must try to remain in power.

ELECT 1)
)
ELECT 2) - See descriptions under "C. History."
)
ELECT 3)

GVOTE
This simulation determines the probability that a committee will have transitive preferences among mutually exclusive alternatives using majority votes.

JUDGE
This is a judicial process simulation in which the user plays the role of the defense attorney in a court trial.

MASPAR
This program contains a model that illustrates the relationship that exists in a society between social status and organizational involvement on the one hand and mass political participation on the other.

POLICY
This is a simulation of interest groups, specifically focusing on the public policy enacted by the government.

POLSYS
This is a simulation of the processes which groups and individuals use in an effort to influence city hall.

## E. Psychology

ROBOT
This program enables you to influence the personality of a robot.

Appendix B (Cont'd.)

VIII. Teacher Aids

DRILL
This is a general, all-purpose drill program.

TDRILL
This program aids the teacher in developing a lesson to be used with the program "Drill."

# APPENDIX A10

## Computer Education Curriculum Guide Distribution List

# DISTRIBUTION OF COMPUTER EDUCATION

# CURRICULUM GUIDES

September, 1975

## Christiana High

| | | |
|---|---|---|
| 1. | Business Education Department through Mrs. Grace Owen | (8) |
| 2. | Mathematics Department through Mr. Jack Baldino | (8) |
| 3. | Science Department through Mr. Edwin Stowell | (7) |
| 4. | Social Studies Department through Mr. Frank Hagen | (11) |
| 5. | Mrs. Anna Billey, Summer Workshop participant | (1) |
| 6. | Mr. Peter Dewitt, Summer Workshop participant | (1) |
| 7. | Mr. Richard Groo, Summer Workshop participant | (1) |
| 8. | Mr. Gilmore Ott, Principal | (1) |
| 9. | Mr. Vern Wolf, Associate Principal | (1) |

## Glasgow High

| | | |
|---|---|---|
| 1. | Business Education Department through Mr. Thomas Concavage | (5) |
| 2. | Mathematics Department through Mr. Ted Miller | (10) |
| 3. | Science Department through Mr. Ronald Hull | (7) |
| 4. | Social Studies Department through Mr. Thomas Stewark | (12) |
| 5. | Miss Sally Bowser, Summer Workshop participant | (1) |
| 6. | Mr. Phillip DeWeese, Summer Workshop participant | (1) |
| 7. | Ms. Frank Dickerson, Summer Workshop participant | (1) |
| 8. | Ms. Jane McFann, Summer Workshop participant | (1) |
| 9. | Ms. Nancy Pierce, Summer Workshop participant | (1) |
| 10. | Mrs. Suzanne Steinberger, Summer Workshop participant | (1) |
| 11. | Mr. John Brandt, Principal | (1) |
| 12. | Mr. Thomas Comer, Associate Principal | (1) |

## Newark High

| | | |
|---|---|---|
| 1. | Business Education Department through Ms. Regecca Feikls | (9) |
| 2. | Mathematics Department through Mr. Rodney Hart | (12) |
| 3. | Science Department through Mr. Donald Allen | (9) |
| 4. | Social Studies Department through Mr. Michael Epler | (12) |
| 5. | Mr. Kenneth Weinig, Summer Workshop participant | (1) |
| 6. | Mr.James Otto, Summer Workshop participant | (1) |
| 7. | Mr. William Stockebrand, Principal | (1) |
| 8. | Mr. Richard Musselman, Associate Principal | (1) |

## Others

| | | |
|---|---|---|
| 1. | Dr. John Allen, Deputy Superintendent | (1) |
| 2. | Mr. Nelson Freidly, Director of Secondary Education | (1) |
| 3. | Dr. Loren Thompson, Director of Instruction | (1) |

# THE DEVELOPMENT AND IMPLEMENTATION OF A DISTRICT COMPUTER EDUCATION PROGRAM

## APPENDIX B

### Staff Development

B1: Funding Approval for Staff Member to Attend In-depth School

B2: Report on the Attendance of a Staff Member at an In-depth Computer Training School

B3: Spring Computer Inservice Workshop Class List

B4: Spring Computer Inservice Workshop Objectives

B5: Spring Computer Inservice Workshop Assignment Sheets

B6: Invitations for Computer Informational Meetings

B7: Proposal for Summer Computer Workshop for Teachers

B8: Request to Principals to Identify Summer Computer Workshop Participants

B9: Invitation to Summer Computer Workshop Participants

B10: Summer Computer Workshop Participant List

B11: Summer Computer Workshop Agenda, Objectives, and Worksheets

B12: Glasgow High School Summer Workshop Proposal

B13: Christiana High School Summer Workshop Proposal

# APPENDIX B1

## Funding Approval for Staff Member to Attend In-Depth School

Neil

from the desk of

CATHARINE Y. BONNEY

Charlotte said it was O.K. to use Del Mod money for the computer workshop.

C.Y.B.

11/8/74

# APPENDIX B2

## Report on the Attendance of a Staff Member at an In-Depth Computer Training School

# A REPORT ON MR. DARRELL PELLEY'S ATTENDANCE AT THE WANG LABORATORIES IN-DEPTH COMPUTER TRAINING SCHOOL

February 12, 1975

With the installation of the computer system at Glasgow High School in the fall of 1974, it quickly became evident that there was a need for at least one person to have in-depth training on the system. This was especially crucial if the hardware was to be used effectively in furthering individualization in the areas of mathematics and science. Thus, the funds which remained from the Del Mod "Humanizing Mathematics and Science" Project were used to send Mr. Darrell A. Pelley to the five day in-depth training school at Wang Laboratories located in Tewksbury, Massachusetts.

Mr. Pelley attended the school during the week of February 3, 1975. This particular week was chosen in order that his training would be accomplished prior to the first district-wide inservice day. This was necessary because Mr. Pelley was scheduled to conduct a workshop on computer education on those days.

Mr. Pelley's reaction to the school was extremely positive. He related that the class size was limited to eight participants. Also, an attempt was made to create a group with different backgrounds and varied application interest areas. Thus, he was the only educator in his group and had an opportunity to interact with people involved in military, medical, industrial, and construction applications.

The training Mr. Pelley received was very valuable for him personally. His expertise can also be tapped as the district moves forward with its plans for computer education.

Funds expended for Mr. Pelley's training were as follows:

| | | |
|---|---|---|
| A. | Tuition | $385.00 |
| B. | Travel and Motel | 209.11 |
| C. | Substitution | 130.00 |
| | TOTAL | $724.11 |

mhh

# APPENDIX B3

## Spring Computer Inservice Workshop Class List

WORKSHOP #22 - COMPUTERS

Location
Glasgow H.S., Room M-208

## ATTENDANCE VERIFICATION FORM

DATE: ____________

**Participants:**

Carol Brown, GHS
Ted Miller, GHS
Darrell Pelley, GHS
Ron Hull, GHS
Dock Williams, GHS
G. Alderson, NHS
M. A. Pelley, NHS
L. Bartle, NHS
M. Doughty, NHS
R. Feikls, NHS
Glenn Craig, Smith
William Lewis, Chris-Salem
Kathy Williams, Gauger
Barbara Jones, Gauger
Georgia Cressman, Gauger
Faye deFarkas, McVey
Nicolo Fera, GHS
Elaine Matt, GHS
Carl Jacobson, GHS
John Persinger, Sterck

Jack Baldino, CHS
Kathleen Elliston, CHS
Steven Palmer, CHS
William Murphy CHS
Bill Johnstone, NHS
Ken Klimek, CHS
Lois Watson, GHS

ADD:
RODNEY HART NHS
JANICE YORKE GHS
JOAN FESSLER GHS

Please verify your attendance on this date by initialing next to your name.

Verified by: ____________ GROUP LEADER ____________ DATE

Return completed form to: DIRECTOR OF INSTRUCTION

mjh
12/15/72

## APPENDIX B4

## Spring Computer Inservice Workshop Objectives

COMPUTER WORKSHOP
No. 22

February 14, 1975

I. The objectives of this workshop

A. For participants who know little or nothing about computers and BASIC language:

1. Learn some elementary BASIC commands and programming techniques.

2. Practice programming the Wang 2200 and use some of its peripherals.

3. Discover some tasks that Glasgow's Wang system can do for you and your subject area.

B. For participants who know BASIC and are already familiar with a computer system:

1. Learn how to operate Glasgow's Wang 2200 system.

2. Use your knowledge of BASIC and programming techniques on the 2200 to learn of its specific powers (and limitations).

# APPENDIX B5

## Spring Computer Inservice Workshop Assignment Sheets

# BASIC

| Vocabulary | Exercises |
|---|---|
| PRINT | 1. 3 + 4 + 6 |
| +, -, *, /, ↑<br>order: ( )<br>↑<br>*, /<br>+, - | 2. 2(5 + 7) - 3<br>3. 5(2) , $5^2$, $5^{10}$, $5^{50}$ |
| ABS, INT, SQR, LOG, EXP, SGN<br>SIN, COS, TAN, ARC___, ATN, RND | 4. Sin$\frac{\pi}{3}$ , cos$\frac{\pi}{3}$, tan$\frac{\pi}{4}$ |
| SELECT r<br>d<br>g | 5. Sin 60°, cox 60°, tan 45° |
| LET<br>Assignment statement<br>Variables: letter<br>letter digit | 6. LET X = 5<br>PRINT X<br>7. LET X = X + 1<br>PRINT X<br>8. A B C8 C28 XY<br>2D 5F W8 W13 W2<br>H7 09 I1 J9 IOU<br>F-2 3 X3.1 |
| -RESET<br>1. Clears screen<br>~~2. Sets all variables to zero~~ | |
| -CLEAR<br>1. Clears screen<br>2. Removes all program statements<br>3. Initializes all variables | |
| Line numbers From 1 to 9999<br>GO TO<br>Unconditional branch | 9. 10 LET X = 1<br>20 PRINT X, X↑2, X↑3<br>30 LET X = X + 1<br>40 GO TO 20 |
| -RUN<br>Instructs computer to<br>-HALT/STEP<br>Execute program statements<br>Execute program one line at a time | |
| -RESET<br>1. Halts program execution | |
| -LIST<br>reprints all current<br>program statements | |

**IF THEN**

conditional branch transfers to given line if condition is satisfied, otherwise goes on to next line.

**END**

stops program execution and displays amount of available memory.

**PRINT " "**

characters enclosed in quotes are displayed on screen.

**-SAVE**

stores current program on tape

**-LOAD**

places previously saved program from tape into computer memory

**PRINT;**

semicolon causes fields to be ignored and output is packed together.

**INPUT**

causes computer to stop execution and await operator input. Displays question mark.

#1

```
10 X = 1
20 PRINT X, 2*X, X↑2, 2↑X
30 X = X + 1
40 IF X < 10 THEN 20
50 END
```

#2

```
10 X = 1
20 PRINT X, 2*X, X↑2, 2↑X
30 X = X + 1
40 IF X < 10 THEN 20
50 END

15 PRINT "NUMBER", "DOUBLED", "SQU
```

#3

```
10 X = 1
20 Y = 2
30 Z = 3
40 PRINT X,Y,Z
```

#4

```
10 X = 1
20 Y = 2
30 Z = 3
40 PRINT X,Y,Z
50 PRINT X; Y; Z
```

#5

```
30 INPUT X, Y, Z
40 PRINT X,Y,Z
50 PRINT X; Y; Z
```

## GRADES

①

```
10 INPUT A,B,C,D,E,F
20 G = (A+B+C+D+E+F)/6
30 PRINT "AVE = "; G
```

INPUT "   ",
same as PRINT "   ";
and INPUT

②

```
10 INPUT "ENTER GRADES", A,B,C,D,E,
20 G = (A+B+C+D+E+F)/6
30 PRINT "AVE = "; G
```

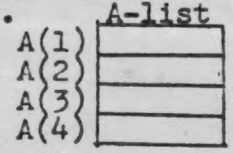
FOR     TO
provides automatic looping

NEXT

③

```
10 PRINT "ENTER GRADES"
20 FOR I = 1 TO 6
30   INPUT G
40   S = S + G
50 NEXT I
60 A = S/6
70 PRINT "AVE = "; A
```

array variables
lists of related quantities
may be given a single name.
e.g.



DIM A(n)
reserves computer space
for an array of n elements.

④

```
 5 DIM G(6)
10 PRINT "ENTER GRADES"
20 FOR I = 1 TO 6
25   PRINT "TEST ";I;
30   INPUT G(I)
40   S = S + G(I)
50 NEXT I
60 A = S/6
70 PRINT "AVE = "; A
```

string variables
same as variables
except store strings
of characters in the
"box" instead of values

A$, A1$, A5$

# APPENDIX B6

## Invitations for Computer Informational Meetings

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

May 5, 1975

MEMORANDUM TO: Mr. Ott, Christiana High
Mr. Stockebrand, Newark High

FROM: F. Neil Walzl
Supervisor of Mathematics

RE: Visitation to Glasgow Computer Facilities

We are having a short workshop on Wednesday, May 14, at Glasgow High for the purpose of giving staff members of Christiana High and Newark High an opportunity to see and try the computer facilities there. If you or any members of your staff are interested in attending, we will start about 3:15 in Room M-208 and continue as long as necessary.

Some of your staff members are already familiar with the equipment because they attended the district in-service workshop or are serving on the district computer education committee. However, there are probably others who also have an interest in computer education.

This meeting, while of interest to Math and Science teachers, should not be considered as exclusively for them. It is open to all staff members. If any are interested, please tell them they are welcome to attend. It is not necessary to pre-register, but if you get an approximate count, please let me know.

Thank you.

FNW/clp

cc: Mrs. Bonney
Mr. Freidly

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

May 5, 1975

MEMORANDUM TO: Mr. Bab, Shue Middle School
Mr. Levy, Ogletown Middle School

FROM: F. Neil Walzl fnw
Supervisor of Mathematics

RE: VISITATION TO GLASGOW COMPUTER FACILITIES

We are having a short workshop on Wednesday, May 21, at Glasgow High for the purpose of giving staff members of Christiana High and Newark High an opportunity to see and try the computer facilities there. If you, or any member of your staff, are interested in attending we will start about 3:15 in Room M-208 and continue as long as necessary.

Some of your staff members are already familiar with the equipment because they attended the District inservice workshop or are serving on the District computer education committee. However, there are probably others who also have an interest in computer education.

This meeting, while of interest to Math and Science teachers, should not be considered as exclusively for them. It is open to all staff members. If any are interested please tell them they are welcome to attend. It is not necessary to pre-register, but if you get an approximate count, please let me know.

Thank you.

FNW/clp

cc: Mrs. Bonney
Mr. Freidly

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK DELAWARE

May 5, 1975

MEMORANDUM TO: Dr. Ferguson, Central Middle School
Dr. Thompson, Gauger Middle School

FROM: F. Neil Walzl fnw
Supervisor of Mathematics

RE: VISITATION TO GLASGOW COMPUTER FACILITIES

We are having a short workshop on Thursday, May 22, at Glasgow High for the purpose of giving staff members of Christiana High and Newark High an opportunity to see and try the computer facilities there. If you, or any members of your staff, are interested in attending, we will start about 3:15 in Room M-208 and continue as long as necessary.

Some of your staff members are already familiar with the equipment because they attended the District inservice workshop or are serving on the District computer education committee. However, there are probably others who also have an interest in computer education.

This meeting, while of interest to Math and Science teachers, should not be considered as exclusively for them. It is open to all staff members. If any are interested, please tell them they are welcome to attend. It is not necessary to pre-register, but if you get an approximate count, please let me know.

Thank you.

FNW/clp

cc: Mrs. Bonney
Mr. Freidly

# APPENDIX B7

## Proposal for Summer Computer Workshop for Teachers

NEWARK SCHOOL DISTRICT
OFFICE OF THE DIRECTOR OF INSTRUCTION
NEWARK, DELAWARE

MEMORANDUM TO: Neil Walzl

FROM: Catharine Y. Bonney

RE: WORKSHOP PROPOSAL - Staff Development. Computers

We are in receipt of your request for funds to conduct a workshop. Approval has been granted for this proposal in the amount of $ 2,506.50

Grant is awarded pending receipt of the following:

X List of participants by name. Please indicate if the person is a workshop coordinator/leader and should receive $8.10 per hour, a participant and should receive $5.30 per hour, or under contract and should receive no additional pay;

____ Name, title, social security number, and DELAWARE LICENSE NUMBER of paid resource persons/consultants. Their function and remuneration rate should be spelled out. CONSULTANTS MAY NOT BE EMPLOYED UNLESS THEY HAVE A DELAWARE LICENSE NUMBER AND HAVE SIGNED A CONSULTANT CONTRACT (Available upon request from this office).

X Copies of materials and curriculum guides developed. (These may be submitted at the conclusion of the workshop);

____ Plans and procedures for evaluation of the workshop;

X Upon completion of the workshop, a workshop evaluation and attendance record report should be submitted;

X Finalized Agenda including dates, times, and locations

X THIS GRANT WILL EXPIRE ON July 18, 1975
Funds not encumbered through this office by 7/18/75 ____________ will revert without further notice. Please notify this office of any change in workshop dates which might affect this grant.

ADDITIONAL COMMENTS:

X Initial report due July 18, 1975
Final report due December, 1975

ORM 1004 (Rev. 12/74)

UNDING REQUEST FOR PROGRAM
ND STAFF DEVELOPMENT ACTIVITIES

ATE SUBMITTED: April 25, 1975

FOR OFFICE USE ONLY NO 44
Approved: C.Y.
Date: 5/4/75
Amount:
Budget:
Initial Report Due:
Final Report Due:
Funds Revert:

NEWARK SCHOOL DISTRICT
Newark, Delaware

I. Person(s) Making Request F. Neil Walzl (Name) Administration Building (School)

I. Type of Request: Check appropriate line in BOTH Column A and B

| Column A | Column B |
|---|---|
| x staff development | ___ school level |
| ___ program development | x district level |

II. Respond as carefully as possible to each of the following questions:

A. Statement of the problem to be considered;

B. 1. List the alternatives you have already attempted as a means of dealing with this problem;

2. List any activities that others in the district or elsewhere have already undertaken to deal with the problem;

C. List your major goals and objectives in the following areas:

1. Preparation of instructional materials, curriculum guides, course outlines, etc.;

2. What new or improved competencies do you expect teachers to have as a result of this activity;

3. What new or improved competencies do you expect students to have as a result of this activity;

D. Describe the activities to be carried out (include a copy of the program or an agenda, whichever is applicable);

E. Given the response to B, why is the activity you proposed in D needed?

F. Evaluation:

1. Describe the procedures for evaluating the activities (upon completion of the activity);

2. Describe the procedures you will use, and determine the date for final evaluation concerning:

a. degree of success in achieving the aims listed in C;

b. impact on the school program, including student and/or staff behavioral changes.

IV. Reports:

A. A report of your activities, including the evaluation results described in F 1, will be due one week after the activities are concluded.

B. A final report will be due upon completion of your final evaluation.

REQUESTS SUBMITTED ON FORM #1004 WILL BE CONSIDERED AS FOLLOWS:

Requests for fall inservice (up to Christmas break) will be reviewed the third Monday in September

Requests for winter inservice (after Christmas break) will be reviewed the third Monday in November

Requests for summer inservice will be reviewed the third Monday in March

V. BUDGET (include breakdown by categories, i.e., participants, resource persons, materials, etc.)

| Categories | Justification * | Amount ** |
|---|---|---|
| Personnel:<br>Leaders<br>1 | 15 hours @ 8.10/hr.<br>To conduct the workshop & provide the necessary leadership. | $121.50 |
| Participants<br>30 Teachers | 15 hours at ~~$5.30~~/hr. 5.30 ~~5.40~~<br>Partipants will learn the techniques necessary to apply computer concepts in their classrooms. | ~~2430.00~~<br>~~$2,385.00~~ ✓ |
| Resource Persons<br>Supervisor of Mathematics | | - |
| Released time Substitutes | | - |
| Materials & Supplies | | - |
| Clerical and Other | | |

TOTAL ~~$2,506.50~~ ✓ ~~2551.50~~

* Justification for each budget category should be presented in terms of the tasks to be accomplished, services rendered, etc., and in relation to the realization of the major goals and objectives, by number, listed in C.

** Participant amounts should reflect the state scale and the degree of involvement of the participants.

SIGNATURE OF PERSON REQUESTING FUNDS

1/25/75
DATE

Return in Duplicate to:

Director of Instruction

# A REQUEST FOR STAFF DEVELOPMENT FUNDS
# FOR THE SUMMER OF 1975
# TO TRAIN TEACHERS TO USE COMPUTERS

III. A & B In order for students to meet the updated goals and objectives for computer education in the district, there is a need for additional teacher training in the field of computer education. In the past the training of teachers in computer education has been largely limited to mathematics and science teachers. Through courses which have been offered at the University of Delaware, many math and science teachers have been trained in computer programming, but there has been no training in the actual utilization of computers in the curriculum of the district. Furthermore, the training that has been received by teachers has been highly theoretical in nature. Activities attempted elsewhere in training people in computer education have been also largely limited to mathematics and science teachers. Thus, the problem is two fold. One, to involve teachers other than mathematics and science teachers in the field of computer education and two, to instruct all teachers, including mathematics and science teachers, as to how computer education activities can be incorporated into their classroom teaching techniques.

C. A list of the major goals and objectives are as follows:

1. Teachers will be able to access and utilize canned programs for computer education.

2. Teachers will be able to make simple computer programs which can be used in their classroom.

3. Teachers will utilize their computer programming techniques and knowledge of canned programs, etc. in their existing courses to add a dimension to these courses which will help students meet the goals and objectives of the district in computer education.

D. Activities will include a 15 hour workshop designed to:

1. Teach teachers how to access existing computer facilities.

2. Teach teachers how to write simple computer programs.

3. Teach teachers how to utilize computer programming techniques and canned computer programs in their courses.

4. Make teachers aware of those things that exist in the computer education field which are applicable in their own subject areas.

The tentative dates of the workshop will be June 23-27 inclusive.

E. This kind of activity is needed due to the fact that there are no other places to which teachers can turn to learn how computer education can be specifically used at the high school level. Activities or courses which are offered at the university level are usually directed toward indepth computer programming or specific topics in mathematics related to computer programming. There have been no offerings at that level which teachers can turn to to learn about the implementation of computer education in their courses.

F. Evaluation techniques will include the following:

1. Participants will evaluate the degree to which the workshop met the objectives as spelled out on the first day.

2. A follow-up study will be conducted during the fall of the year by the supervisor of mathematics to determine if the techniques learned by the teachers during the workshop are being utilized in their courses.

3. A follow-up study will also be done during the school year to determine if there are additional students involved in activities in computer education.

IV. A. A report of the activities of the workshop will be completed and submitted approximately one week after the summer workshop activities have concluded.

B. A final report will be submitted at the end of the first semester of the 1975-76 school year.

FNW:bap
4/25/75

# APPENDIX B8

## Request to Principals to Identify Summer Computer Workshop Participants

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

May 8, 1975

MEMORANDUM TO: Mr. Ott, Christiana High
Mr. Wolf, Christiana High
Mr. Brandt, Glasgow High
Mr. Comer, Glasgow High
Mr. Stockebrand, Newark High
Mr. Musselman, Newark High

FROM: F. Neil Walzl fw.
Supervisor of Mathematics

RE: Computer Training Workshop for Teachers

Approval has been granted by the district for a 15 hour computer training workshop for teachers. This workshop will be held from 1:00 p.m. to 4:00 p.m., on June 23-27, inclusive. The site will be Glasgow High School, Room M208.

Each school can send 10 participants. No credit will be given, but participants will be paid at the rate of $5.40 per hour.

The choice of who you send is yours but, I would encourage you to send teachers representing as many departments as possible. In particular, the business department should be represented. Participants do not need to have a mathematical background only a desire to learn something about computer education.

Would you please send me a list of those planning to attend by June 2, 1975.

Also, you or any of your administrative staff are most welcome to attend. If any administrators do plan to attend, do not count them as part of the 10 positions allocated unless they are 10 month employees.

Thanks.

FNW:bap

PLEASE RETURN BY JUNE 1, 1975 TO F. NEIL WALZL, ADMINISTRATION

## Participants for Computer Training Workshop

| | Name | Department |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

# APPENDIX B9

## Invitation to Summer Computer Workshop Participants

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE 19711
TELEPHONE 302 731-2000

ADMINISTRATION BUILDING
83 EAST MAIN STREET

May 30, 1975

Dear

The following information pertains to the computer training workshop which you will be attending.

Place - Glasgow High School, Room M-208
Dates - June 23-27, 1975 inclusive
Time - 1:00 p.m. - 4:00 p.m.
Rate of Pay - $5.40 per hour
Instructor - Carl Jacobson, Glasgow High Mathematics Teacher

The purpose of the workshop will be to familiarize you with the equipment at Glasgow High School and to consider ways you might incorporate the use of the computer into your instructional strategies. The instructor will assume that you are entering the "world of computers" at point zero so don't be concerned if you have no previous experience.

If you find that you cannot attend, please let me know as soon as possible.

If I don't hear from you, I will assume you will be attending and will expect to see you at Glasgow High on June 23rd.

Sincerely,

Neil Walzl
Supervisor of Mathematics

FNW/mhh

# APPENDIX B10

## Summer Computer Workshop Participant List

# COMPUTER TRAINING WORKSHOP FOR TEACHERS

## PARTICIPANT LIST

### I. CHRISTIANA HIGH

| | NAME | DEPARTMENT |
|---|---|---|
| 1. | Ralph Graham | Science |
| 2. | Edwin Stowell | Science |
| 3. | Grace Owen | Business Education |
| 4. | Howard Gerkin | Mathematics |
| 5. | Anna Billey | English |
| 6. | Peter DeWitt | English |
| 7. | Richard Groo | English |
| 8. | Robert Hable | Social Studies |
| 9. | Myron Lazarus | Social Studies |
| 10. | Thomas Mahler | Social Studies |
| 11. | Kristine Rosenberger | Social Studies |
| 12. | Kenneth Williamson | Social Studies |

### II. GLASGOW HIGH

| | | |
|---|---|---|
| 1. | Hubert Prettyman | Business Education |
| 2. | Frances Dickerson | Reading |
| 3. | Jane McFann | English |
| 4. | Suzanne Steinberger | English |
| 5. | Judith Cushman | Social Studies |
| 6. | Elaine Matt | Social Studies |
| 7. | Thomas Stewart | Social Studies |
| 8. | Sally Bowser | Physical Education |
| 9. | Phillip Deweese | Physical Education |
| 10. | Nancy Pierce | Counseling |
| 11. | Cheryl Wheatley | Special Education |

### III. NEWARK HIGH

| | | |
|---|---|---|
| 1. | Clair Clawson | Science |
| 2. | William Harrison | Science |
| 3. | Charlene Coder | Business Education |
| 4. | Rodney Hart | Mathematics |
| 5. | Barbara Kendall | Mathematics |
| 6. | Kenneth Weinig | English |
| 7. | Michael Doughty | Social Studies |
| 8. | Michael Epler | Social Studies |
| 9. | Harry Hudson | Social Studies |
| 10. | James Otto | Industrial Arts |

mhh
6/16/75

# COMPUTER TRAINING WORKSHOP FOR TEACHERS
## PARTICIPANT LIST
June 23-27, 1975

## I. CHRISTIANA HIGH SCHOOL

| | NAME | DEPARTMENT |
|---|---|---|
| 1. | Ralph Graham | Science |
| 2. | Grace Owen | Business Education |
| 3. | Anna Billey | English |
| 4. | Peter DeWitt | English |
| 5. | Richard Groo | English |
| 6. | Robert Hable | Social Studies |
| 7. | Myron Lazarus | Social Studies |
| 8. | Thomas Mahler | Social Studies |
| 9. | Kenneth Williamson | Social Studies |

## II. GLASGOW HIGH

| | | |
|---|---|---|
| 1. | Hubert Prettyman | Business Education |
| 2. | Frances Dickerson | Reading |
| 3. | Jane McFann | English |
| 4. | Suzanne Steinberger | English |
| 5. | Judith Cushman | Social Studies |
| 6. | Elaine Matt | Social Studies |
| 7. | Thomas Stewart | Social Studies |
| 8. | Sally Bowser | Physical Education |
| 9. | Phillip Deweese | Physical Education |
| 10. | Nancy Pierce | Counseling |
| 11. | James Zelonis | Mathematics |

## III. NEWARK HIGH SCHOOL

| | | |
|---|---|---|
| 1. | Clair Clawson | Science |
| 2. | William Harrison | Science |
| 3. | Charlene Coder | Business Education |
| 4. | Rodney Hart | Mathematics |
| 5. | Barbara Kendall | Mathematics |
| 6. | Kenneth Weinig | English |
| 7. | Michael Doughty | Social Studies |
| 8. | Michael Epler | Social Studies |
| 9. | Mary Hudson | Social Studies |
| 10. | James Otto | Industrial Arts |

# APPENDIX B11

## Summer Computer Workshop Agenda, Objectives, and Worksheets

# COMPUTER WORKSHOP FOR TEACHERS

June 23-27, 1975

## AGENDA*

I. Introduction

II. Objectives of the Course

III. "The World of Computers" - An Overview

IV. Computer Applications at Glasgow High School

V. An Introduction to the Wang Computer

VI. The Power of Computers

VII. The Limitation of Computers

VIII. The Wang Computer in the Immediate Mode

IX. Communicating with the Computer - BASIC Commands

X. Computer Goals and Objectives for the Newark School District

*Due to the nature of the workshop and the varied backgrounds of the participants, the order of items might be changed and/or items can be modified.

# COMPUTER TRAINING WORKSHOP FOR TEACHERS

## OBJECTIVES

I. For all participants

To develop an awareness of the role of computers in education and administration.

To provide each participant with minimal "hands on" computer experience with the WANG 2200 system.

To expose the capabilities and limitations of an "in house" system.

To consider the usefulness of the computer as a tool with many educational and administrative applications.

To introduce each participant to the BASIC language and some elementary programming techniques.

II. For participants already familiar with BASIC and a computer system

To learn to operate the WANG 2200 and its peripheral devices.

To utilize the participants'existing programming knowledge to learn the specific powers and weaknesses of the "in house" system.

mhh
6/19/75

# BASIC

| Vocabulary | Exercises |
|---|---|
| PRINT | 1. $3 + 4 + 6$ |
| +, -, *, /, ↑<br>order: ( )<br>↑<br>*, /<br>+, - | 2. $2(5 + 7) - 3$<br>3. $5(2)$ , $5^2$, $5^{10}$, $5^{50}$ |
| ABS, INT, SQR, LOG, EXP, SGN<br>SIN, COS, TAN, ARC___, ATN, RND | 4. $\sin\frac{\pi}{3}$ , $\cos\frac{\pi}{3}$, $\tan\frac{\pi}{4}$ |
| SELECT r<br>d<br>g | 5. Sin 60°, cox 60°, tan 45° |
| LET<br>Assignment statement | 6. LET X = 5<br>PRINT X |
| Variables: letter<br>letter digit | 7. LET X = X + 1<br>PRINT X |
| | 8. A B C8 C28 XY<br>2D 5F W8 W13 W2<br>H7 09 I1 J9 IOU<br>F-2 3 X3.1 |
| -RESET<br>1. Clears screen | |
| -CLEAR<br>1. Clears screen<br>2. Removes all program statements<br>3. Initializes all variables | |
| Line numbers From 1 to 9999 | 9. 10 LET X = 1<br>20 PRINT X, X↑2, X↑3<br>30 LET X = X + 1<br>40 GO TO 20 |
| GO TO<br>Unconditional branch | |
| -RUN<br>Instructs computer to<br>-HALT/STEP<br>Execute program statements<br>Execute program one line at a time | |
| -RESET<br>1. Halts program execution | |
| -LIST<br>reprints all current<br>program statements | |

**IF THEN**
conditional branch transfers to given line if condition is satisfied, otherwise goes on to next line.

#1

```
10 X = 1
20 PRINT X, 2*X, X↑2, 2↑X
30 X = X + 1
40 IF X < 10 THEN 20
50 END
```

**END**
stops program execution and displays amount of available memory.

**PRINT " "**
characters enclosed in quotes are displayed on screen.

#2

```
10 X = 1
20 PRINT X, 2*X, X↑2, 2↑X
30 X = X + 1
40 IF X < 10 THEN 20
50 END

15 PRINT "NUMBER", "DOUBLED", "SOU
```

**-SAVE**
stores current program on tape

**-LOAD**
places previously saved program from tape into computer memory

#3

```
10 X = 1
20 Y = 2
30 Z = 3
40 PRINT X,Y,Z
```

**PRINT;**
semicolon causes fields to be ignored and output is packed together.

#4

```
10 X = 1
20 Y = 2
30 Z = 3
40 PRINT X,Y,Z
50 PRINT X; Y; Z
```

**INPUT**
causes computer to stop execution and await operator input. Displays question mark.

#5

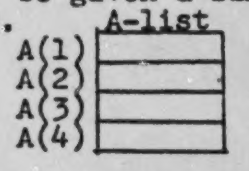
```
30 INPUT X, Y, Z
40 PRINT X,Y,Z
50 PRINT X; Y; Z
```

**INPUT** " ",
same as PRINT " ";
and INPUT

**FOR** TO
provides automatic looping

**NEXT**

**array** variables
lists of related quantities
may be given a single name.
e.g.



**DIM** A(n)
reserves computer space
for an array of n elements.

**string** variables
same as variables
except store strings
of characters in the
"box" instead of values

## GRADES

①

```
10 INPUT A,B,C,D,E,F
20 G = (A+B+C+D+E+F)/6
30 PRINT "AVE = "; G
```

②

```
10 INPUT "ENTER GRADES", A,B,C,D,E,F
20 G = (A+B+C+D+E+F)/6
30 PRINT "AVE = "; G
```

③

```
10 PRINT "ENTER GRADES"
20 FOR I = 1 TO 6
30   INPUT G
40   S = S + G
50 NEXT I
60 A = S/6
70 PRINT "AVE = "; A
```

④

```
 5 DIM G(6)
10 PRINT "ENTER GRADES"
20 FOR I = 1 TO 6
25   PRINT "TEST ";I;
30   INPUT G(I)
40   S = S + G(I)
50 NEXT I
60 A = S/6
70 PRINT "AVE = "; A
```

A$, A1$, A5$

# APPENDIX B12

## Glasgow High School Summer Workshop Proposal

FORM 1004 (Rev. 12/74)

**FUNDING REQUEST FOR PROGRAM AND STAFF DEVELOPMENT ACTIVITIES**

FOR OFFICE USE ONLY: No. [illegible]
Approved: [illegible]
Date: 5/1/75
Amount: $1,356.—
Budget: 23
Initial Report Due: ____
Final Report Due: ____
Funds Revert: 9/19/75

DATE SUBMITTED: April 23, 1975

## NEWARK SCHOOL DISTRICT
Newark, Delaware

I. Person(s) Making Request Mathematics Department (Name) Glasgow High School (School)

I. Type of Request: Check appropriate line in BOTH Column A and B

| Column A | Column B |
|---|---|
| ___ staff development | X school level |
| X program development | ___ district level |

II. Respond as carefully as possible to each of the following questions:

A. Statement of the problem to be considered;

B. 1. List the alternatives you have already attempted as a means of dealing with this problem;
   2. List any activities that others in the district or elsewhere have already undertaken to deal with the problem;

C. List your major goals and objectives in the following areas:
   1. Preparation of instructional materials, curriculum guides, course outlines, etc.;
   2. What new or improved competencies do you expect teachers to have as a result of this activity;
   3. What new or improved competencies do you expect students to have as a result of this activity;

D. Describe the activities to be carried out (include a copy of the program or an agenda, whichever is applicable);

E. Given the response to B, why is the activity you proposed in D needed?

F. Evaluation:
   1. Describe the procedures for evaluating the activities (upon completion of the activity);
   2. Describe the procedures you will use, and determine the date for final evaluation concerning:
      a. degree of success in achieving the aims listed in C;
      b. impact on the school program, including student and/or staff behavioral changes.

IV. Reports:

A. A report of your activities, including the evaluation results described in F 1, will be due one week after the activities are concluded.

B. A final report will be due upon completion of your final evaluation.

**REQUESTS SUBMITTED ON FORM #1004 WILL BE CONSIDERED AS FOLLOWS:**

Requests for fall inservice (up to Christmas break) will be reviewed the third Monday in September

Requests for winter inservice (after Christmas break) will be reviewed the third Monday in November

Requests for summer inservice will be reviewed the third Monday in March

## V. BUDGET (include breakdown by categories, i.e., participants, resource persons, materials, etc.)

| Categories | Justification * | Amount ** |
|---|---|---|
| Personnel:<br>Leaders | Ted Miller | 1 @ 8.10 /hr<br>30 hr x 8.10= 243.00 |
| Participants | Joan Fessler Teacher A<br>Dock Williams Teacher B<br>Carol Brown<br>Nick Fera<br>Darrell Pelley | 7 @ 5.30 /hr<br>1131.00<br>210 hrs x 5.30= 1,113.00 |
| Resource Persons | | |
| Released time Substitutes | | |
| Materials & Supplies | | |
| Clerical and Other | | |

TOTAL 1377.00 ~~$1,356.00~~

* Justification for each budget category should be presented in terms of the tasks to be accomplished, services rendered, etc., and in relation to the realization of the major goals and objectives, by number, listed in C.

** Participant amounts should reflect the state scale and the degree of involvement of the participants.

Thomas C. Comer
SIGNATURE OF PERSON REQUESTING FUNDS

4/23/75
DATE

Return in Duplicate to:

Director of Instruction
Administration Building

mjh

III.

A. The opening of school in September, 1975 at Glasgow High will require further coordination and refinement in the Mathematics curriculum in preparation for the implementation of a full, four-year mathematics program. The following program areas need special consideration:

1. Orientation of added staff members regarding departmental structure, procedures and policies, and curriculum.
2. Refine existing and generate new procedures and policies for sequential course offerings.
3. Finalize course objectives and outlines for the new courses of the expanded mathematics program.
4. Develop methods to integrate computer usage and application within the entire curriculum.

B.

1. Preliminary work has been doen through present school-year department work. However, our situation now warrants a full-time concentrated department effort.
2. Within the district, the other mathematics programs are on-going but our concern is in the development of totally new course offerings.
3 A district committee is currently working on goals & objectives + course guides for computer ed.

C.

1. Write course outlines and objectives for:
   a. Calculus
   b. Trigonmetry/Analysis of Functions
   c. Intermediate Algebra
   ~~d. Computers I, II~~
2. ADOPT THE WORK OF THE DISTRICT committee relating to ~~Prepare~~ computer ~~related~~ objectives and activities for existing courses.
3. Up date and expand existing course objectives.
4. Formulate specific recommendations for sequential courses regarding student placement and earned credits.
5. Orient the incoming department members regarding:
   a. department curriculum
   b. available resource and supplemental materials
   c. departmental philosophics and policies

D. Activities:

1. Department discussions and identification of problem-areas.
2. Small-group work to develop recommended solutions.
3. Department review and finalization of recommendations.
4. Small-group work on new course outlines and objectives.

5. Present department members will work individually with incoming department members to apprise them of availability and location of necessary as well as supplemental teaching materials.

E. The problems and situations described in A require additional time and concentrated efforts beyond weekly department sessions.

F. At the conclusion of the entire session, revised and new course outlines, objectives, and departmental policies will be presented to the appropriate Associate Principal for his approval and/or modification.

# APPENDIX B13

## Christiana High School Summer Workshop Proposal

34

Approved: C.y.B.
Date: 9/18/75
Amount:
Budget: 23
Initial Report Due:
Final Report Due:
Funds Revert:

## FUNDING REQUEST FOR PROGRAM AND STAFF DEVELOPMENT ACTIVITIES

DATE OF PROPOSED WORKSHOP August 25-29, 1975

TITLE: Christiana High

NEWARK SCHOOL DISTRICT
Newark, Delaware

I. Person(s) Making Request John J. Baldino (Name) Christiana High School (School)

I. Type of Request: Check appropriate line in BOTH Column A and B

Letter sent 9/16

Date 9/19

| Column A | Column B |
|---|---|
| X staff development | x school level |
| X program development | ___ district level |

I. Respond as carefully as possible to each of the following questions:

A. Statement of the problem to be considered;

B. 1. List the alternatives you have already attempted as a means of dealing with this problem;
   2. List any activities that others in the district or elsewhere have already undertaken to deal with the problem;

C. List your major goals and objectives in the following areas:
   1. Preparation of instructional materials, curriculum guides, course outlines, etc.;
   2. What new or improved competencies do you expect teachers to have as a result of this activity;
   3. What new or improved competencies do you expect students to have as a result of this activity;

D. Describe the activities to be carried out (include a copy of the program or an agenda, whichever is applicable);

E. Given the response to B, why is the activity you proposed in D needed?

F. Evaluation:
   1. Describe the procedures for evaluating the activities (upon completion of the activity);
   2. Describe the procedures you will use, and determine the date for final evaluation concerning:
      a. degree of success in achieving the aims listed in C;
      b. impact on the school program, including student and/or staff behavioral changes.

IV. Reports:

A. A report of your activities, including the evaluation results described in F 1, will be due one week after the activities are concluded.

B. A final report will be due upon completion of your final evaluation.

REQUESTS SUBMITTED ON FORM #1004 WILL BE CONSIDERED AS FOLLOWS:

Requests for fall inservice (up to Christmas break) will be reviewed the third Monday in September

Requests for winter inservice (after Christmas break) will be reviewed the third Monday in November

Requests for summer inservice will be reviewed the third Monday in March

## V. BUDGET (include breakdown by categories, i.e., participants, resource persons, materials, etc.)

| Categories | Justification * | Amount ** |
|---|---|---|
| **Personnel:**<br>Leaders<br>2 | John J. Baldino - Steven C. Palmer to conduct the workshop and provide the necessary leadership 60 hours at $8.10/hr. | $ 486.00 |
| **Participants**<br>6 for 3 days | Participants will learn to use computers and how to apply them effectively in their classrooms. 108 hrs. at $5.40 per hour | 583.20 |
| **Resource Persons**<br>Supervisor of Mathematics | | -- |
| **Released time Substitutes**<br>-- | | -- |
| **Materials & Supplies**<br>20 computer tapes | | 25.00 |
| **Clerical and Other** | | |
| | TOTAL | $1,094.20 |

* Justification for each budget category should be presented in terms of the tasks to be accomplished, services rendered, etc., and in relation to the realization of the major goals and objectives, by number, listed in C.

** Participant amounts should reflect the state scale and the degree of involvement of the participants.

John J. Baldino
SIGNATURE OF PERSON REQUESTING FUNDS

6/13/75
DATE

Return in Duplicate to:

Director of Instruction
Administration Building

mjh

## FUNDING REQUEST FOR PROGRAM AND STAFF DEVELOPMENT ACTIVITIES

III. A. With the proposed acquisition of computers for Christiana High School, there is a need to orient more fully the mathematics staff to their capabilities in order that effective utilization be achieved throughout the year. In addition, there is a need to adopt existing programs to the hardware and determine where these will fit into the existing mathematics curriculum at Christiana High.

B. 1. Alternatives had not been attempted previously because the hardware was not available.

2. Several Christiana mathematics teachers have attended an introductory workshop on the hardware during the 1974-75 district-wide inservice days. In addition, others will be attending an introductory course which will be conducted during the summer of 1975.

The developments of the district-wide computer objectives writing workshop and the work of the Glasgow High staff during the 1974-75 school year will be used as input for this workshop.

C. 1. At the completion of the workshop each teacher will:

a. demonstrate his ability to access "canned programs."

b. demonstrate his knowledge of programming techniques.

c. demonstrate his ability to cope with normal technical machine peculiarities.

d. demonstrate his ability to write a sample program.

2. At the completion of the workshop, each teacher will demonstrate his ability to function as a lab supervisor for the purpose of helping students to overcome difficulties they will encounter regarding machine operations and programming problems.

3. At the completion of the workshop, a set of "canned programs" for classroom applications will have been prepared and debugged. Where applicable, "canned programs" would have been modified and improved.

4. At the completion of the workshop, a list of additional applications (with a description and outline) that are not available will have been compiled.

## D. Agenda

August 25, 1975

Participants: John Baldino, Steven Palmer

Time: 8:30-3:30

Place: Christiana High School

Activities: Preparation, organization, and final planning for workshop

Test machines for proper working conditions

Debugging of existing library functions

Duplicating and translating personal programs developed for the Delta system from paper tape to casettes

August 26, 27, 28, 1975

Participants: John Baldino, Steven Palmer, Mary Pritchett, Franklin Sykes, Howard Gerkin, Linda Davidson, Teacher X, Teacher Y.

Time: 8:30 - 3:30

Place: Christiana High School

Activities: Familiarize staff with existing "canned programs."

Familiarize staff with methods of accessing "canned program."

Instruct staff on general machine operation, programming techniques, and knowledge necessary to function as a lab supervisor.

Compile a list of classroom applications with a description and outline for each.

Modify and improve existing programs.

## FUNDING REQUEST FOR PROGRAM AND STAFF DEVELOPMENT ACTIVITIES

August 29, 1975

Participants: John Baldino, Steven Palmer

Time: 8:30-3:30

Place: Christiana High School

Activities: Outline department activities relating to computer education for the 1975-76 school year.

Start writing and debugging suggested programs for classroom applications which were compiled during the previous workshop days.

E. In order for all teachers to utilize the computer hardware immediately, the necessary per-planning must take place before the start of the 1975-76 school year and should involve as many of the staff members as possible.

F. 1. Each participant will be evaluated on an individual basis to determine if he has achieved the objectives listed in C1 and C2.

2. "Canned programs" which have been modified or developed will be judged by the supervisor of mathematics on the merits of their applicability and usability.

3. Written documents which will be prepared will be judged by the supervisor of mathematics to determine if they are consistent with district format and are applicable in other schools.

4. Participants will evaluate the degree to which the objectives of the workshop have been met.

5. A follow-up study will be done to ascertain the degree of utilization by students and teachers during the 1975-76 school year. (This will be incorporated in the existing method of determining the utilization of the mathematics laboratory.)

mhh
6/13/75

# THE DEVELOPMENT AND IMPLEMENTATION OF A DISTRICT COMPUTER EDUCATION PROGRAM

## APPENDIX C

### Student Involvement

C1: School Newspaper Article Advertising Mini-Courses
C2: Invitations Sent to Students for the Mini-Courses
C3: Mini-Course Class Lists
C4: Student Materials for Mini-Courses
C5: Tape Cassette Check-Out List
C6: Additional Check-Out Lists
C7: Samples of Student Generated Programs
C8: "Mathematics Through the Computer" Course Guide
C9: Summer School Catalog Description for "Mathematics Through the Computer"
C10: Special Flyer for "Mathematics Through the Computer:
C11: "Mathematics Through the Computer" Class List
C12: Title of Programs Generated by Students Attending "Mathematics Through the Computer"

# APPENDIX C1

## School Newspaper Article Advertising Mini-Courses

# dragon's tale

Glasgow High School, Newark,

Volume II, No. 3

February, 1975

## RY DEPT.
## NS TRIP

ley, in an effort
is students the
yesterday, has
trip to Williams-
inia. It is now
y scheduled for
22 nd 23. Mr.
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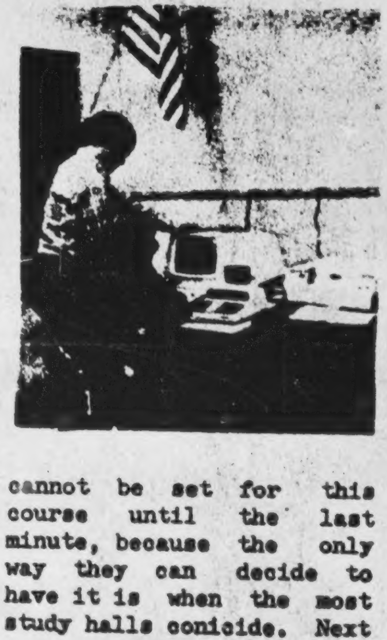
ple going by per-
ly his class to
e on the excur-
dents will travel
us limiting the
ng to about 41.
st each student a
s than 50 dollars
fare, motel
tickets and food,
day tour. Mr.
ches U.S. History
this first hand
of colonial
ll be beneficial.

e locations that
visited are the
urgesses, Gover-
sion, many old
craftsman shops,
built 17th cent-
and also William
College. Other
ed to be visited
own Yorktown,
lant ion. When
he arranged the
said, "To give
a first hand
of how life
e changed since
. Also, it is an

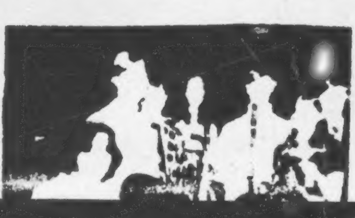
# MIRACLEMACHINES



Have you been to the math area lately? Well, if you havent, you should stop by. New this year is our computer room with four Wamg computers in M-208.

If you have a problem to solve, or you just feel like bowling or playing the slot machines, thus is the place to go! There are a number of things the computer can do. It can play almost any type of game, or figure out any problem If the computer does not know how to do what you want, you can even program it yourself.

Because the program is just starting out, it has not yet been offered as a class, but things are starting to roll. Third and fourth quarter a course is being offered in computer operating. Mr. Walzl is going to be the instructor, and if interested you can sign up with Mr. Pelley in C-207. The time cannot be set for this course until the last minute, because the only way they can decide to have it is when the most study halls conicide. Next year two definate courses will be offered. The courses willbe Computer I, for the beginners, and Computer II, for the people who know something about these (fantastic) machines.



## SHOW C
## TO BE ERE

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erected in the s
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professed intere
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felt that he wou
liked to have par
in sports in later
high school.
This showcase i
of promoting schoo
tive to all the st

## All-Sta
## Band

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State Band include
Glasgow High Scho
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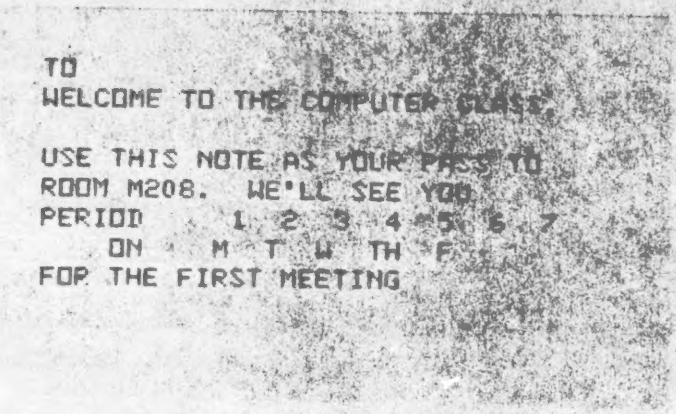
dition committe.
ditions were on Ja
1975 at Symrna Hig

# APPENDIX C2

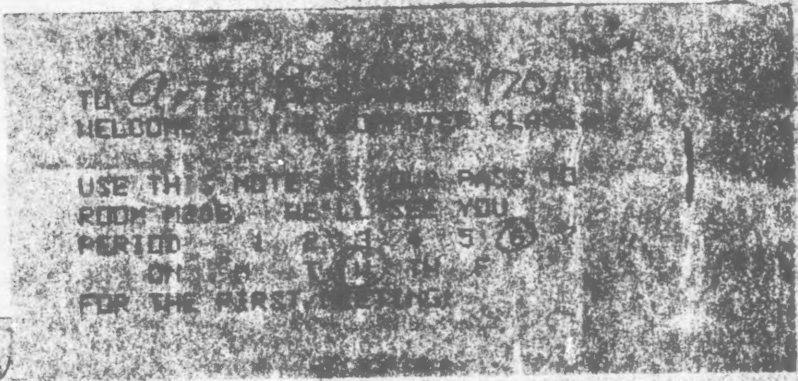
## Invitations Sent to Students for the Mini-Courses



TO

WELCOME TO THE COMPUTER CLASS.

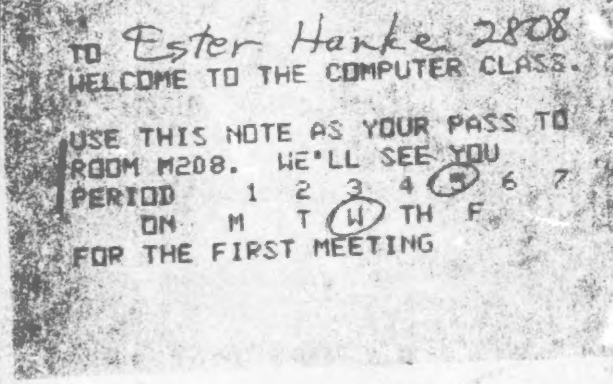
USE THIS NOTE AS YOUR PASS TO
ROOM M208. WE'LL SEE YOU
PERIOD 1 2 3 4 5 6 7
ON M T W TH F
FOR THE FIRST MEETING



TO [illegible] 1701

WELCOME TO THE COMPUTER CLASS.

USE THIS NOTE AS YOUR PASS TO
ROOM M208. WE'LL SEE YOU
PERIOD 1 2 3 4 5 [✓ 6] 7
ON M T [✓ W] TH F
FOR THE FIRST MEETING



TO Ester Hanke 2808

WELCOME TO THE COMPUTER CLASS.

USE THIS NOTE AS YOUR PASS TO
ROOM M208. WE'LL SEE YOU
PERIOD 1 2 3 4 [✓ 5] 6 7
ON M T [✓ W] TH F
FOR THE FIRST MEETING

TO [illegible] 1602

WELCOME TO THE COMPUTER CLASS.

USE THIS NOTE AS YOUR PASS TO
ROOM M208. WE'LL SEE YOU
PERIOD 1 2 3 4 [✓ 5] 6 7
ON M T [✓ W] TH F
FOR THE FIRST MEETING

# APPENDIX C3

## Mini-Course Class Lists

COMPUTER MINI-COURSE CLASS LIST

GLASGOW HIGH SCHOOL

SPRING, 1975

INSTRUCTOR, F. NEIL WALZL

| Name | Hr. | Most Recent Math Course | Periods Available 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| Gene Bradfield | 1602 | Algebra II (H) | | | | | X | | |
| Michael Brown | 1803 | Basic Skills | | | X | | | | |
| Art Bachman | 1701 | Geometry I | MWF | | | | | X | |
| Gary Baker | 1720 | Elem. Algebra II | | | X | X | | MWF | |
| Steve Bunville | 1803 | Algebra I | | | X | X | | | |
| Harry Blaine | 1802 | Algebra I | X | | | X | | | X |
| Fred Biesecher | 1802 | Elem. Algebra | | | X | | | | X |
| Della Banks | 1801 | Elem. Algebra | | | | X | | | |
| Erick Bergstrom | 1601 | Algebra I | | | | X | | X | |
| Steve Borst | 1602 | Rec. Math | | | | | | | X |
| Jeff Cook | 1720 | Geometry | | | | | X | | |
| Brett Carmine | 1602 | Algebra II | | TRF | | | | X | |
| Larry Clement | 2710 | Geometry I | | | | | | X | |
| Wade Catt | 1720 | Geometry I | | | | | MWF | X | |
| Ben Cameransi | 1602 | Algebra II | | | | X | | | |
| Greg Clinton | 1603 | Elem. Geometry | X | | | | | X | |

| Name | Hr. | Most Recent Math Course | Periods Available | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Mike Dignon | 1604 | Algebra I | | | | | | MWF | |
| Jack Douglas | 1604 | Algebra II | | | X | | X | | |
| Jim Ebert | 1806 | Algebra I | | | | MWF | | | |
| Tim Fahey | 1806 | Elem. Algebra | X | | | | | | |
| Mike Goodman | 1606 | Pre Algebra | | X | | | | X | |
| Esther Hanke | 2808 | Algebra I | | | | | X | | |
| Lee Howell | 2809 | Elem. Algebra | | | | X | | | X |
| Robin Johnson | 2820 | Geometry I | | | X | | X | | |
| Scott Kline | 2809 | Elem. Algebra | | | | MWF | | | |
| Uzi Levin | 2810 | Algebra II | | X | | X | | | |
| Jeff Lord | 2811 | Elem. Algebra | X | | | | | | |
| Bill Lotter | 2811 | Algebra I | X | | | | | | |
| Steve McLeod | 2812 | Algebra I | | | | | X | | |
| Jim McLaren | | | | | | | | | |
| David Miller | 2812 | Algebra I | X | | | | | | |
| Jerry Meier | 2812 | Elem. Algebra | X | | | X | | | |
| Brenda Leman | 2610 | Geometry I | | | | | | | X |
| Ruth O'Farrell | 3813 | Ind. Math | | | X | | | X | |
| Keith Sands | 3815 | Algebra I | | | | | | X | |
| Dennis Shelalis | 3615 | Bus. Math | X | | X | | | | |

| Name | Hr. | Most Recent Math Course | Periods Available 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| Elizabeth Smith | 3816 | Algebra I | | | | | X | | |
| Kerry Walzl | 3617 | Algebra II (H) | | MWF | | X | | | |
| Karen Wheatley | 3720 | Geometry I | | | | | | | X |
| Debbie White | 3718 | Geometry I | | | | | | MWF | |
| Mike Yarucci | 3819 | Basic Skills | | | X | | | | |
| Eddy Yoder | 3819 | Ele. Algebra | | | | X | | | X |

FNW:rls
11/13/75

# APPENDIX C4

## Student Materials for Mini-Courses

COMPUTER MINI-COURSE
GLASGOW HIGH SCHOOL
SPRING, 1975
Instructor: F. Neil Walzl

To The Student:

In this course, you will be learning to use the in-house computers located here at Glasgow High School. The course will be informal: no grades will be given, no credit will be awarded, and your attendance (or lack of) will not be reported to the office.

We will spend only a minimal amount of time formally discussing various topics. The rest of the time you will be working independently (or in small groups) with the hardware. However, I will provide you with help as the need arises.

The objectives I would like to see each of you master are as follows:

1. Initialize the computer.
2. Use the machine as a calculator.
3. Load a program from tape.
4. Save a program on tape.
5. Write a simple program without branching.
6. Write a simple program with unconditional branching.

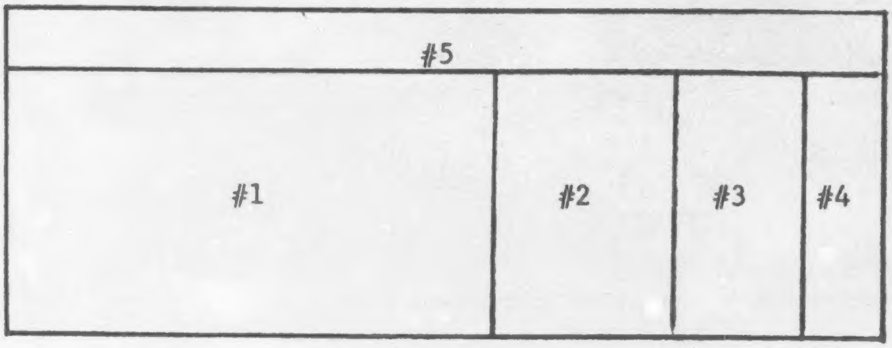
7. Write a simple program with conditional branching.
8. Write a simple program with a loop.
9. Write a program which utilizes array variables.
10. Write a program which utilizes string variables.
11. Write a program which utilizes hex codes.

As you master the various BASIC commands, functions, and statements, it will be your job to let me know in order that I can "check out" your skills.

Finally, the attached materials are for your use. Keep them handy, but remember, they are only a synopsis of some of the BASIC commands, functions, and statements. For further information, use the books and manuals found here in the computer room.

## WANG 2200 SERIES

### I. KEY BOARD (MODEL 2215)



There are 5 zones on the keyboard

Zone #1 contains the BASIC language keyboard keys and alpha and special characters.

Zone #2 contains numeric entry keys.

Zone #3 contains the arithmetic operators, math functions, and the punctuation symbols.

Zone #4 contains the edit and error correction keys.

Zone #5 contains the user defined special function keys.

### II. USING THE SYSTEM AS A CALCULATOR

To use the system as a calculator, perform the following steps:

a. Touch the print key
b. Enter your calculation
c. Touch the execute key

The answer will automatically print. For example, to add 25 + 8:

a. Touch PRINT
b. Enter 25 + 8
c. Touch execute

The display will look like the following.

```
PRINT 25 + 8
33
```

Perform the following calculations.

1. 86.2 + 155.86
2. 6723 - 1965
3. 47 ÷ 16
4. 52 x 7
5. The sum of 47.3 and 92.8
6. The product of 3, 4, and 5
7. 842 minus 681
8. The quotient of 481 divided by 3.2

## III. CALCULATOR FACTS

The system follows all the accepted rules associated with algebra.

The order of execution is as follows:

a. Exponentation (↑) computed first
b. Division (/)
   Multiplication (*) } computed second
c. Subtraction (-)
   Addition (+) } computed third

Using these priorities, all expressions are evaluated left to right.

If you want to change the order of operations (execution), insert parentheses. You may insert as many sets of parentheses as necessary.

For example, 25 + 3 * 7 would equal 46, while (25 + 3) * 7 would equal 196.

Note: Implied multiplication is not allowed. For example, 3 * (4 + 5) is correct, while 3(4 + 5) is not.

## IV. FLOATING POINT NUMBERS

When entering numbers, you are limited to 13 digits. If you want to enter very large or very small numbers, another format, referred to as floating point, can be used. (You might be familiar with the special case called scientific notation.)

Examples of numbers represented in floating point are:

a. 6.02 x $10^{24}$
b. 195 x $10^{18}$
c. 5.1 x $10^{-5}$
d. .016 x $10^{5}$

These numbers would be entered in the following manner.

a. 6.02 E 24
b. 195 E 18
c. 5.1 E -5
d. .016 E 5

The largest exponent you can use is 99 while the smallest is -99. The exponent must always be an integer.

## V. ERROR DETECTORS

If you do not follow the established rules when entering numbers and formats, the system will automatically tell you by displaying an error message.

An error message on the screen will look like the following.

```
PRINT 3 * SQR(17
                ↑ERR 05
```

ERR 05 means that a right parentheses is missing. For a complete listing of the error messages, check the appendix in the programming manual.

## VI. USING VARIABLES AND ASSIGNING THEM VALUES

The use of variables is mathematical shorthand which allows you to assign a numeric value to a letter (variable) and use this letter in several different expressions where the variable has the same value for each expression.

There are 286 different variable names available. The names consist of a single letter (A-Z) or a letter and a digit (0-9). These variables are called numeric scalar variables.

Example of legal variable names are:

A, B, C, R2, S6, Y0.

When a numeric variable is given a value, the process is called assigning it a value. A numeric variable can have only one value at a time. The format is as follows·

```
X = 25   F = 4/3 * # Pi * 7↑2

Y6 = 30  C = SQR (A↑2 + B↑2)
```

The variable is always on the left hand side of the equality sign and the value assigned is always on the right. The equality sign must always be used.

## VII. PERFORMING MORE THAN ONE CALCULATION PER LINE

It is possible to enter more than one statement per statement line. Simply separate each statement by a colon (:). By doing this you can take advantage of the size of the CRT (i.e. 64 characters per line).

The following example contains three statements.

```
PRINT 15:  PRINT SQR (15):  PRINT 15↑ (1/3)
```

## VIII. PRINTING OUT MORE THAN ONE VALUE PER LINE

### A. Zoned Format

The CRT display is divided into four 16-space fields or zones.

To generate more than one output value per line, with each value in a separate zone, values are printed in a single PRINT statement with commas separating the values.

For example, PRINT 1, 2, 3, 4 would look like

```
     1        2        3        4
```

on the CRT.

B. Packed Format

While a zoned format lets you print up to four values per line, a packed format enables you to print more than four values on one line. To generate packed formats, <u>semicolons</u> are used between each of the values.

For example, PRINT 1; 2; 3; 4; 5; 6; 7 would look like

```
1  2  3  4  5  6  7
```

on the CRT.

It is permissible to mix zoned and packed formats on the same line.

For example, PRINT "VALUE=";50,,"NEW VALUE=";51 would look like

```
VALUE = 50        NEW VALUE = 51
```

on the CRT.

C. The TAB function

The TAB function works like the tab stop on a typewriter. When the machine comes to a TAB (A) function, it spaces in A spaces automatically, and then proceeds to print the next part of the statement.

For example, PRINT TAB (20); 25 would look like (25 spaces)        25
on the CRT

The contents of the parentheses of a TAB function can be any number or algebraic expression. For example, PRINT TAB (2↑3) would space in 8 spaces.

## IX. LOOPING

### A. Using the FOR-TO/NEXT statements

The FOR-TO/NEXT type of loop consists of three parts. Part 1 consists of establishing the loop. Part 2 consists of any computation, etc. that you wish to do. Part 3 consists of the command to repeat the loop.

An example of this type of loop could look like the following:

$$\text{For } \underbrace{\text{X = 1 to 10}}_{\text{Part 1}}\text{: } \underbrace{\text{PRINT X}}_{\text{Part 2}}\text{: } \underbrace{\text{NEXT X}}_{\text{Part 3}}$$

This loop would print the numbers 1 to 10 one to a line.

The loop need not start at one, and the step can be changed by adding one additional command. For example,

```
FOR X = 3 to 12 STEP.5:  PRINT X:  NEXT X
```

will generate 19 values (3, 3.5, 4, 4.5,.....12) and print them one to a line.

By inserting various punctuation symbols, you can change the printing format.

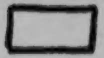
## X. FLOWCHARTING

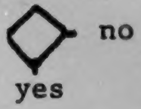
When someone decides to write a program, one does not sit down and immediately enter the program into the machine. Rather, it is first necessary to begin by thoroughly analyzing the problem. Part of this process includes making a flowchart. A flowchart is a visual representation of all the steps required to solve a problem.

The common flowcharting symbols are:

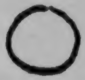
An oval ⬭ which indicates a starting or stopping operation.

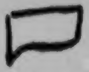
Arrows ⟶ which indicate the direction flow

A Rectangular Box  which indicates an operation

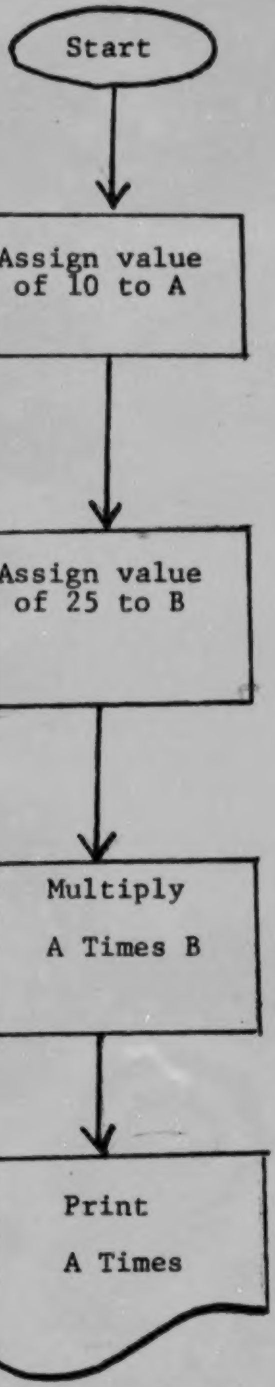
A Diamond 

which indicates a decision

A Circle  which indicates a continuation

A Cutoff Rectangle  which indicates a printout or display.

An example of a flowchart follows:


Start
Assign value of 10 to A
Assign value of 25 to B
Multiply A Times B
Print A Times

```
10 A = 10
20 B = 25
30 C = A * B
40 PRINT C
```

## XI. SIMPLE COMPUTER PROGRAMMING

After a problem is analyzed, the next step is to write a program. The only difference between using the system as a calculator or a programmable calculator is the use of statement line numbers. When a statement line number precedes a line, it immediately indicates to the system that it is in the programming mode. The use of a line number enables you to execute a line again and again.

Remember, each line must start with a statement number.

Statement numbers do not have to be sequential. In fact, it is to your advantage to leave spaces in order that you can insert additional lines if necessary.

Before entering a program, you should clear the machine. There are 3 CLEAR commands.

CLEAR - clears memory completely

CLEAR V - clears only variables from memory

CLEAR P - clears only program text from memory

The following is a simple program ready for entering:

```
10 A=10
20 B=25
30 C=SQR (A↑2 + B↑2)
40 Print A, B, C
50 END
```

This program will square A, square B, add the results, print the original A & B, print the final results.

See if you can enter and run this program. If you want to change a line, enter the same line number followed by the new line.

If you want to delete a line, enter the line number and touch execute.

## XII. THE BASIC COMMANDS

### A. STOP & CONTINUE

Inserting a stop statement merely halts the execution of the program. It does not disturb any variables. If a literal message follows the stop statement, it is automatically printed. To start the program again, touch CONTINUE.

### B. END

In addition to the STOP statement, another statement which terminates program execution is the END statement. This statement is optional. It performs two functions:

1. Halts program execution
2. Displays the total amount of unused memory.

### C. REM

The REM (or remark) statement is used to insert explanatory notes into a program. It does not print but is used only as a programming aid. However, it does take up available memory space.

### D. GO TO

The GO TO statement is always used with a line number. For instance, GO TO 20 will cause the program to branch to line 20 each time it is executed.

Its advantages are obvious. First, you can repeat parts of your program over and over and second you can carry out the program in an order other than which it was written.

### E. GO SUB

The GO SUB statement causes a branch to subroutine. A subroutine is a program within a program. For instance, GO SUB 200 would branch to the subroutine that starts at line 200. The subroutine must always end with A RETURN statement. Execution will then return to the next statement immediately following the GO SUB statement.

## F. IF - THEN

The IF - THEN statement is a conditional branch which has the ability to test values and branch if a condition is met, and not branch if the condition is not met.

The general form of the IF - THEN statement is as follows:

$$\text{IF (operand)} \left\{ \begin{matrix} < \\ <= \\ = \\ >= \\ > \\ <> \end{matrix} \right\} \text{(operand) THEN (line \#)}$$

Where the operand can be a literal string, alphanumeric variable, or an expression.

The following are examples of legal IF - THEN statements:

```
20 IF X>Y THEN 50

20 IF T<14 THEN 50

20 IF A↑B<>C↑D THEN 50
```

Can you tell when each of the preceeding statements will jump to line 50?

## XIII. ADDITIONAL METHODS OF ASSIGNING VALUES TO VARIABLES

In addition to the assignment statement, there are two other methods of changing the value of a variable in a program. These are (1) the READ & DATA statements and (2) the INPUT statement.

A. The READ and DATA statements are used together. An example of the data statement is:

$$\underbrace{100}_{\text{Statement Line No.}}\ \text{DATA}\ \underbrace{5,\ 3,\ 17.2,\ 6}_{\text{Data Separated by Commas}}$$

The system automatically sets a data pointer to the location of the first value in the DATA statement. It does not matter whether the data is included in one statement or several. For instance,

```
100 DATA 5

110 DATA 3, 17.2

120 DATA 6
```

is equivalent to the previous example.

In order to use the data contained in the DATA statement, it is necessary to use the READ statement.

For example:

```
10 DATA 3, 4, 5, 6, 7, 8, 9, 10

20 READ A, B, C, D
```

will cause the system to assign 3 to A, 4 to B, 5 to C, and 6 to D. If line 20 is executed a second time, the system will then assign 7 to A, 8 to B, 9 to C, and 10 to D.

This imples that all the data need not be read at one time. Further, several READ statements can be used to read the data. However, it is very important to consider the order in which the data appears.

B. The INPUT statement is used to enable a person to enter data after execution is started. Thus, the input data does not become a part of the program text.

The general form is INPUT (variable). When the system reaches an INPUT statement, it stops and prints out a question mark (?). The user is then expected to enter data values, one for each variable named in the INPUT statement, separated by commas

A literal string can be included in the INPUT statement. For example,

```
10 INPUT "NEXT VALUE" A
```

would be displayed on the CRT as

```
NEXT VALUE?
```

and enables the user to see what is expected to be entered.

mhh

## LOOKING FOR SYNTAX ERRORS

Directions: Determine whether the syntax of the following BASIC statements is correct. If it is incorrect, cite the appropriate definition(s) and statement requirements.

| | STATEMENT | CORRECT | INCORRECT |
|---|---|---|---|
| 1 | REM JOE PROGRAMMER | | |
| 2 | READ A1 | | |
| 3 | READ A1,B,C(2),L,K,"HI" | | |
| 4.2 | PRINT Y(1,2) | | |
| 5 | PRINT 1,2, "TWO NUMBERS" | | |
| 6 | LET A = 1 | | |
| 7 | LET B = A | | |
| 8 | LET 9B = A + 1.5 | | |
| 9 | LET B = ((A + D)/C ↑(E - F)) - 75.43 | | |
| 10 | LET G(A + B) = ((A + B)/C ↑(E - F) - 75.43 | | |
| 11 | IF 7 = 7 THEN 7 | | |
| 12 | IF B = 25.4 THEN 61.3 | | |
| 13 | IF Y + J = 17/K THEN 54 + K | | |
| 14 | DIM K(10,20) | | |
| 15 | DIM A(K) | | |
| 16 | FOR I(5) = 1 TO 10 STEP .5 | | |
| 17 | GOTO 37854 | | |
| 18 | STOP 61 | | |
| 19 | PRINT PROCESSING FINISHED | | |
| 20 | FOR A9 = 1 TO 7 | | |

FNW:jjg
3/3/75

## PROGRAMMING PROBLEMS

1. Write a program which will compute the sum of the first 100 whole numbers and print the sum.

2. Write a program which will compute the sum of the first 100 whole numbers, compute the sum of the squares of the first 100 whole numbers, and print the answers.

3. Revise your program for Problem #2 so you can compute the sum of a series which starts anywhere and ends anywhere.

4. The quadratic formula is:

$$x = -b + \frac{\sqrt{b^2 - 4ac}}{2a}$$

Where a, b, and c are found in the general form of the quadratic $ax^2 + bx + c = 0$. Write a program to find the solution for a quadratic equation using this program.

NOTE: You will have a problem if $(\sqrt{b^2 - 4ac}) < 0$.

5. Write a program to find the hypotenuse of a right traingle if the legs are known.

(Rule of Pythagoras is $a^2 + b^2 = c^2$).

6. Write a program to find a leg of a right triangle if the hypotenuse and one leg are known.

7. The formula for simple interest is i = Prt. Write a program for computing simple interest.

FNWalzl:bap
2/75

# APPENDIX C5

## Tape Cassette Check-Out List

COMPUTER MINI-COURSE
GLASGOW HIGH SCHOOL
Spring, 1975

## TAPE CASSETTE CHECK-OUT

The student will demonstrate to the instructor the ability to successfully carry out the following tasks. For successful completion, the proficiency level must be 100%.

1. Load the first program from tape into memory.
2. Skip the first n files and load the n+1 program into memory.
3. Backspace over n files and load the next program into memory.
4. Save a program with or without a name.

# APPENDIX C6

## Additional Check-Out Lists

COMPUTER MINI-COURSE
GLASGOW HIGH SCHOOL
Spring, 1975

## INITIALIZING THE MACHINE CHECK-OUT

The student will demonstrate to the instructor the ability to successfully carry out the following tasks. For successful completion, the proficiency level must be 100%.

1. Turn the power on.
2. Clear memory.
3. Clear the CRT screen and adjust the intensity to the proper level.

COMPUTER MINI-COURSE
GLASGOW HIGH SCHOOL
Spring, 1975

## USING THE COMPUTER IN THE IMMEDIATE MODE CHECK-OUT

The student will demonstrate to the instructor the ability to successfully carry out the following tasks. A proficiency level of 100% is expected in part I. The proficiency level for part II will depend on the math background of the student.

I. Using the system as a calculator, perform the following calculations.

- A. 14 + 6
- B. 8 x 6
- C. 8 - 12.66
- D. 96 ÷ 853
- E. 7 - 12.6 + 8 - .002
- F. $5^3$
- G. Print the sum of 86.2 and 155.6
- H. Print the result of 8522 minus 1498
- I. Print the quotient of 20 divided by 4.25

II. Using the system in the immediate mode, find the following.

- A. Sin. of 3.2 radians
- B. Cos. of 35 degrees
- C. Square root of 148
- D. The absolute value of (3 + - 8)
- E. The greatest integer value of the square root of 3.27 x 9.25 ÷ .003

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GLASGOW HIGH SCHOOL
Spring, 1975

## ELEMENTARY BASIC STATEMENTS CHECK-OUT

The student will demonstrate to the instructor the ability to successfully carry out the following tasks. The tasks need not all be done at the same time. Also, the proficiency level must be 100%.

### I. PRINT STATEMENT

```
10    A = B : B = 15 : C = 20 : D = 25
20
```

Using the preceeding two-step program, complete line #20 so:

- A. The value of A, B, C, & D are printed in the four zones on a single line.
- B. The values of A, B, C, & D are each printed on a single line.
- C. The values of A, B, C, & D are printed one after the other in a single line (packed format).
- D. The value of A is printed 20 spaces in the left-hand side of the CRT.

### II. LOOPING

- A. Write a one-step program which will print the first 10 integers.
- B. Write a one-step program which will print the numbers from -3 to +3 in steps of ½.

### III. UNDERSTAND BRANCHING

```
10    A = 10
20    B = A + 5
30    PRINT B, A
40    A = A + 1
50
```

Complete line 50 so the program will always jump to line 20.

### IV. INPUT STATEMENT

```
10
20    I = P* R* T
30    PRINT I
40    END
```

Complete line 10 so you can put in your own values for P, R, and T.

### V.

```
10
20    I = P* R* T
30    PRINT I
40
```

Complete lines 10 and 50 using the READ and DATA statements to compute the interest on $1000 at 5% for 3 years.

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## FLOWCHARTING CHECK-OUT

A. Construct a flowchart illustrating how you might drive a car to school. Use at least two decision boxes.

B. Construct a flow chart illustrating the following program.

```
10    A = 1 : B = 2

20    C = A + B + C

30    IF  C > 15 THEN 50

40    PRINT C

50    GO TO 10

60    END
```

# APPENDIX C7

## Samples of Student Generated Programs

```
10PRINT "SUM OF FIRST 100 NUMBERS"
20FOR I=1TO 100:X=X+I:PRINT X:NEXT I
30END
```

```
10PRINT "SUM OF FIRST 100 NUMBERS SQUARED"
20FOR I=1TO 100:X=X+I↑2:PRINT X:NEXT I
30END
```

```
10PRINT "SUM OF THE SQUARES OF ANY NUMBER TO ANY NUMBER"
20INPUT A,B
30 FOR I=ATO B:X=X+I↑2:PRINT X:NEXT I
40 END
```

```
10PRINT "QUADRATIC FORMULA"
20INPUT A,B,C
30 X=(-B+SQR(B↑2-4*A*C))/(2*A)
40 Y=(-B-SQR(B↑2-4*A*C))/(2*A)
50PRINT X:Y
60END
```

```
10PRINT "FORMULA FOR THE HYPOTENUSE OF A RIGHT TRIANGLE"
20PRINT "IF LEGS ARE KNOWN."
30 INPUT A,B
40 C=A↑2+B↑2
50 C=SQR(C)
60PRINT C
70END
```

```
10PRINT "FORMULA FOR THE HYPOTENUSE OF A RIGHT TRIANGLE"
20PRINT "IF ONE LEG IS KNOWN."
30INPUT C,B
40A=SQR(C↑2-B↑2)
50PRINT A
60END
```

```
10PRINT "SIMPLE INTEREST"
20INPUT "PRINCIPAL",P
30INPUT "RATE",R
40INPUT "TIME",T
50 I=P*R*T/100
60 PRINT I
70 END
```

```
5 REM SIMULATES A GAME.  COIN IS TOSSED.  'HEADS' -- ROLL A DIE
6 REM TO DETERMINE POINTS GAINED.  'TAILS' -- ROLL A DIE TO
7 REM DETERMINE POINTS LOST.  PRINTS TOTAL GAIN(LOSS) AT END
10PRINT "HEADS","TAILS"
20FOR I=1 TO 20
30X=RND(1)
40IF X<.5 THEN 80
50PRINT "H";
60LET W=0
70 W=INT(6*RND(3))+1
75PRINT W
78GOTO 110
80PRINT ,"T";
90LET W=0
100W=INT((6*RND(8))+1)*(-1)
105PRINT W
110LET M=M+W
120NEXT I
130IF M>=0THEN 150
140PRINT "YOU LOST ";M;" POINTS"
145STOP
150PRINT "YOU GAINED ";M;" POINTS"
160END
```

```
5 REM SIMULATES TOSSING OF A COIN 20 TIMES.  REPORTS TOTAL
6 REM NUMBER OF HEADS AND TAILS AT END
10LET T=0
20LET H=0
30FOR I=1 TO 20
40LET R=RND(1)
50IF R<.5THEN 70
60IF R>=.5THEN 90
70LET H=H+1
80PRINT "HEADS"
85GOTO 110
90LET T=T+1
100PRINT "TAILS"
110NEXT I
120PRINT "NUMBERS OF HEADS=";H
130PRINT "NUMBER OF TAILS=";T
140END
```

```
5INPUT "IF YOU ARE READY TO BEGIN TYPE OUT READY",Z$
6IF Z$<> "READY" THEN 5
7PRINT HEX(03)
10A=0:B=0:C=0:E=0:F=0:G=0:H=0:I=0:J=0:K=0:M=0:P=0
20PRINT "THIS PROGRAM IS DESIGNED TO TAKE VARIOUS GRADES AND COM
PUTE      THE AVERAGE, THE MEAN, AND GIVE YOU YOUR GRADES IN ORD
ER"
30DIM A(20):DIM B1(20)
40INPUT "HOW MANY GRADES DO YOU WISH TO USE(LIMIT 20)",B
50IF B>20THEN 40
60FOR D=1 TO B
70INPUT "PUT IN A GRADE",A(D)
80C=C+A(D)
90NEXT D
100E=C/B:PRINT E;"IS YOUR AVERAGE"
110F=B/2:IF F =INT(F) THEN 130
120G=A(INT(F)+1):GOTO 140
130H=INT(F):I=H+1:J=A(H)+A(I):G=J/2
140PRINT G;"IS YOUR MEAN"
150FOR K=1 TO B:L=0
160FOR M=1 TO B: IF L<A(M)THEN 180
170GOTO 190
180T=L:L=A(M):A(M)=T
190NEXT M
200B1(K)=L:NEXT K
210PRINT "YOUR GRADES IN ORDER, FROM LARGEST TO SMALLEST"
220FOR P=1TO B:PRINT B1(P):NEXT P
230GOTO 5
```

```
10A=0:B=0:C=0:E=0:F=0
20PRINT "THIS PROGRAM WILL TELL YOU THE NUMBER OF PRIMES BETWEEN
 ANY           GIVEN TWO INTEGERS "
30INPUT "WHAT ARE YOUR 2 POSTIIVE INTEGERS",A,B
40E=A+1:F=B-1:C=0
50IF A<=0THEN 70
60GOTO 80
70PRINT "PLEASE USE 2 POSITIVE INTEGERS":GOTO 30
80IF A>B THEN 100
90GOTO 110
100PRINT "PLEASE MAKE THE 2ND INTEGER GREATER THAN THE 1ST":GOTO
30
110FOR D=E TO F
120IF D/2=INT(D/2)THEN 140
130GOTO 160
140IF D/2<>1THEN 210
150GOTO 200
160IF D=3THEN 200
170FOR G=3TO SQR(D)STEP 2
180IF D/G=INT(D/G)THEN 210
190NEXT G
200PRINT D;"IS A PRIME":C=C+1
210NEXT D
220PRINT "THERE ARE(IS)";C;"PRIME(S) BETWEEN";A;"AND";B
230END
```

```
10PRINT "*******************************************************
********"
20PRINT "                  SEMI-PERIMETER"
30PRINT "*******************************************************
********"
40INPUT "INPUT THE THREE(3) SIDES",A,B,C
50S=(A+B+C)/2
60PRINT "                THE SEMI-PERIMETER IS";S
70PRINT "*******************************************************
********"
80PRINT "                      HERON'S THEOREM"
90PRINT "*******************************************************
*******"
100R=SQR(S*(S-A)*(S-B)*(S-C))
110PRINT R
```

```
10INPUT  N
20IF  N>= 1 THEN  50
30PRINT "NOT A POSITIVE INTEGER"
40GOTO 10
50FOR D = 1 TO N
60IF N/D= INT(N/D) THEN 80
70NEXT D
80PRINT N/D;D
90 NEXT D
100END
```

```
10PRINT "FINDING ALL POSITIVE, INTERGRAL FACTORS OF ANY NUMBER"
20 INPUT "WHAT IS THE NUMBER YOU WOULD LIKE TO BE FACTORED",A
30Z=0
40 FOR N=1 TO A
50 IF A/N=INT(A/N) THEN 70
60 NEXT N
70 Z=Z+1
80PRINT N;",";A/N
90 NEXT N
100 END
```

```
10 PRINT "THIS PROGRAM WILL GIVE YOU PRIME FACTORIZATION OF"
15 PRINT "ANY POS. INT."
20 PRINT "WHAT INTEGER DO YOU WANT TO USE"
30 INPUT N
40 IF N>1 THEN 70
50 PRINT "N IS NOT GREATER THEN 1"
60 GOTO 160
70 FOR B=2 TO SQR(N)
80 IF N/B=INT(N/B) THEN 100
90 GOTO 140
100 IF N/B=1 THEN 150
110 PRINT B;"*";
120 LET N=N/B
130 GOTO 80
140 NEXT B
150 PRINT N;"*1"
160END
```

```
10 PRINT "THIS PROGRAM WILL TELL YOU WETHER THE NUMBER THAT"
20 PRINT "YOU GIVEN TO N IS PERFECT,  ABUNDANT,OR DEFICIENT"
30 DIM A(100)
40 DIM B(100)
45 PRINT "DEFICIENT NUMBERS: ";
50 LET P=1
60 LET D=1
70 FOR N=1 TO 100
80 LET T=0
90 FOR I=1 TO N/2
100 IF N/I=INT(N/I) THEN 120
110 GOTO 130
120 LET T=T+I
130 NEXT I
140 IF T=N THEN 180
150 IF T<N THEN 240
160 IF T>N THEN 210
170 GOTO 250
180 A(P)=N
190 P=P+1
200 GOTO 250
210 B(D)=N
220 D=D+1
230 GOTO 250
240 PRINT N;
250 NEXT N
255 PRINT : PRINT "ABUNDANT NUMBERS: ";
260 FOR I = 1 TO D-1 : PRINT B(I); : NEXT I
265 PRINT : PRINT "PERFECT NUMBERS: ";
270 FOR I = 1 TO P-1: PRINT A(I); : NEXT I
```

# APPENDIX C8

## "Mathematics Through the Computer" Course Guide

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

March 11, 1973

MEMORANDUM TO: Mr. William Krumedas
Newark High School

FROM: F. Neil Walal
Supervisor of Mathematics

RE: Computer Programming Course for the
Extended Year Program

I talked to Carl Jacobson (Glasgow High) about handling the Computer Programming Course in summer school and he is agreeable.

In discussing this with Carl, we decided that a revision of the course guide will be necessary. Also, the course will have to be held at Glasgow High in order that the in-house computer there can be used. (Weighing computer costs vs. transportation costs, this is a much better scheme.) If this is not feasible, let me know.

I will be getting together with Carl in the near future to make further plans and I will keep you posted about our progress.

FNW:bap

cc: Mr. Carl Jacobson, Glasgow High
Mrs. Catherine Y. Bonney
Mr. Nelson Freidly

I. TITLE; Mathematics Through Computers

## II. GENERAL COURSE DESCRIPTION

This is a comprehensive introduction to the world of computers. The topics to be explored include the history of computing, computers in everyday life, operating a computer, communicating with the computer, and computer programming. A knowledge of algebra is helpful, but not necessary. The individualized nature of the course permits the participation of students with varied knowledge in this field.

Classes will consist of short lectures accompanied by "hands on" computer experience. Assignments will include the writing, refinement, and execution of computer programs relating to many topics. A field trip is planned to explore the vast computer system at the University of Delaware.

Upon successful completion of this course a student should have a high degree of literacy in the computer language-BASIC, a proficiency in computer programming, and an ability to operate both "in house" mini-computers and time sharing systems. It is also expected that a students general mathematic's skills and problem solving abilities will be enhanced.

## III. COURSE REQUIREMENTS

A. Attendance: Attendance and participation are required for all class sessions and field trips.

B. Assignments: Satisfactory completion of all assignments is required.

C. Projects: The student is expected to write, refine, and execute assigned computer programs.

D. Exams: The student is expected to complete, with at least 70% proficiency, three written examinations

E. Evaluation: A grade of A, B, C, D, or F will be awarded at the end of this course. This grade will be determined by the level of proficiency with which the student achieved course objectives within the structure of the preceeding requirements.

## IV. MAJOR COURSE ACTIVITIES

The course will be laboratory-oriented in that the major course activities include the classroom developement of computer programs and the subsequent "hands-on" computer execution of these programs. Short lecture sessions utilizing traditional classroom techniques will be combined with computer assisted instruction and individualized instruction. Other activities include in-class readings, viewing of films and at least one visit to a large computing facility.

## V. COURSE GUIDE

### Educational Objective No. 1

To develope a student awareness of the role of computers in today's world.

Instructional Objectives:

Each student will:

Exhibit knowledge of the historical development of machine computing.
Illustrate the cultural and social impacts of computing and data processing.
Demonstrate the capabilities and limitations of the computer.

### Educational Objective No. 2

To provide each student with meaningful "hands-on" computer experience.

Instructional Objectives:

The student will:

Demonstrate the operation of the resident computer.
Exhibit an understanding of the operation of a time share system.
Utilize the immediate mode of the mini-computer as a calculator to aid in problem solving.
Demonstrate correct and efficient usage of the keyboard.
Access the computer's library of stored programs for work in related subject areas.
Demonstrate the ability to address the various peripheral devices of the resident system.

## Educational Objective No. 3

To introduce to the student the logic of computer programming.

## Instructional Objectives:

The student will:

Utilize the mini-computer's TRACE command to follow the chain of logic of an existing program.
Perform program analysis by constructing flow charts of existing programs.
Design simple algorithms for the solution of selected problems.

## Educational Objective No. 4

To expand the students problem solving abilities through the study of computer logic.

## Instructional Objectives:

The student will:

Analyze a given problem intuitively.
Conduct a "Guess and Test" investigation of a problem utilizing a calculator.
Enlist mathematics skills to confirm results and/or refine methods of a particular problem solving strategy.
Refine algorithms and formulate a generalized problem solution.

## Educational Objective No. 5

To develope a proficiency in the computer language-BASIC.

## Instructional Objectives:

The student will:

Translate simple/complex arithmetic statements into computer language and vice versa.
Demonstrate a competency in the fundamentals of the BASIC language.
Refine and rewrite program statements which are insufficient or faulty.
Write and execute simple computer programs utilizing the correct BASIC statements.

## Educational Objective No. 6

To expose the student to the usefulness of the computer as a tool with many applications.

### Instructional Objectives:

The student will:

Demonstrate the usage of the computer as a problem-solving tool.
Exhibit an understanding of the functions of data processing.
Illustrate the role of the computer as a research tool.
Demonstrate the mini-computers value as an educational aid.

## Educational Objective No. 7.

To expand the students programming abilities.

### Instructional Objectives:

The student will:

Demonstrate a high degree of literacy in the BASIC language.
Utilize sophisticated programming techniques to refine, compact, and customize existing computer programs.
Illustrate proper documentation procedures.
Employ program debugging techniques to correct rejected programs.
Write original, efficient programs to solve problems relating to many fields.

## VI. COURSE OUTLINE

I. Introduction

- A. What is a Computer?
- B. History of Machine Computing
- C. Meet the Mini-computer

II. Computer Operation

- A. Fundamentals
- B. Immediate Mode
- C. Canned Programs
- D. Peripheral Devices
- E. Other Systems

III. The Computer's Way of Thinking

- A. Computer Logic
- B. Algorithms
- C. Hand Simulations
- D. Flow Charts

IV. Communication With The Computer-BASIC

- A. Fundamentals
- B. Commands
- C. Variables
- D. Loops
- E. Transfers
- F. Alphanumerics
- G. Input/Output
- H. Subscripts

V. The Computer As a Tool

- A. Problem Solving
- B. Data Processing
- C. Research
- D. Education

VI. Advanced Programming

- A. Arrays
- B. Functions
- C. Documentation
- D. Debugging
- E. Subroutines
- F. Advanced BASIC

# APPENDIX C9

Summer School Catalog Description for "Mathematics Through the Computer"

## MATHEMATICS THROUGH THE COMPUTER

A knowledge of algebra will be useful but not necessarily a prerequisite for the student. Computer programming techniques will be taught, but the course is not a programming course per se. Students will study problems and situations in which the use of the computer naturally arises.

Eligible Students: Newark School District students in grades 9, 10, 11, and 12 in the 1975-76 school year.

Location: Glasgow High School

Length of Course: 6 weeks

Limit: 25 students

Credit: 1

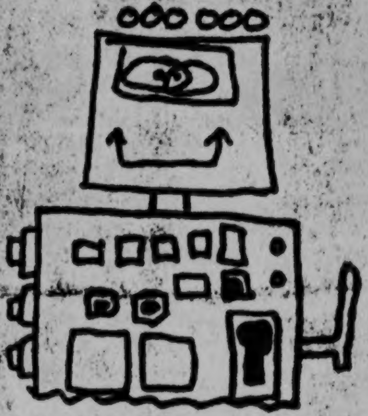
# APPENDIX C10

## Special Flyer for "Mathematics Through the Computer"

# MATHEMATICS THROUGH THE COMPUTER

This is a comprehensive introduction to the world of computers. The topics to be explored include the history of computing, computers in everyday life, operating a computer, communicating with the computer, and programming the computer. A knowledge of algebra is helpful, but not necessary. The individualized nature of the course permits the participation of students with varied knowledge in this field.

Classes will consist of short lectures accompanied by in-class work with Glasgow's four new mini-computers. Assignments will include the writing, refinement, and execution of computer programs relating to many topics. A field trip is planned to explore the vast computer system at the University of Delaware.



**Students** - Newark School District students who will be in grades 9, 10, 11, or 12 in the 1975-76 school year.

**Length of Course** - 7 weeks, June 23 to August 8

**Location** - Glasgow High School

**Time** - 8:40 - 11:50 a.m.

**Credit** - One Credit, Mathematics Elective

**Fee** - None

**For Further Information** -

Contact Mr. Carl Jacobson, Glasgow High School (731-2381) or Summer School Office (731-2320)

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Cut Along This Line

Name ______________________ Grade ______________
Home Address ______________________ School ______________
______________________ Course COMPUTER
Telephone ______________

**Return to your school office by June 9**

District School please return to: Summer School Office, c/o Newark High School

# APPENDIX C11

## "Mathematics Through the Computer" Class List

# CLASS LIST

## SUMMER SCHOOL 1975

## MATH THROUGH THE COMPUTER

INSTRUCTOR - Carl Jacobson
SESSION ONE

| | NAME | SCHOOL | GRADE ENTERING | MATH COURSE ENTERING | FINAL GRADE |
|---|---|---|---|---|---|
| 1. | Karil Jackson | Newark High | 11 | Albebra II Honors | A |
| 2. | James D. Stallings | Newark High | 10 | Geometry | B |
| 3. | Jimmy Ebert | Glasgow High | 10 | Geometry | C |
| 4. | Jeff Fuller | Glasgow High | 9 | Algebra I | W |
| 5. | Ted Leach | Glasgow High | 10 | Geometry | C |
| 6. | Bill Mitchem | Glasgow High | 10 | Geometry | W |
| 7. | Patrick Moore | Glasgow High | 11 | Elementary Algebra | C |
| 8. | David Myer | Glasgow High | 10 | Geometry | W |
| 9. | Duane Noel | Glasgow High | 11 | Algebra II Honors | B |
| 10. | Tom Pellegrene | Glasgow High | 11 | Algebra II Honors | B |
| 11. | Bill Sigmund | Glasgow High | 10 | Elementary Geometry | B |
| 12. | Scott Valletine | Glasgow High | 10 | Geometry | A |

# APPENDIX C12

## Title of Programs Generated by Students Attending "Mathematics Through the Computer"

# MATH THROUGH THE COMPUTER

## Titles of Student Generated Programs
Summer, 1975

### I. Linear Algebra - "Two Point"

1. Distance
2. Midpoint
3. Slope
4. x-intercept
5. y-intercept
6. Equation
7. Perpendicular Bisector

### II. Conic Sections - "Conics"

1. Circle
2. Ellipse
3. Hyperbola
4. Parabola

### III. Arithmetic Sequences - "Sequence"

1. Print n terms
2. Print nth term
3. Common difference
4. General Rule
5. Arithmetic Means

### IV. Series

1. Partial Sums

### V. Square Root

1. "Pinching"

### VI. Limit

1. Convergence
2. Divergent
3. Increasing
4. Decreasing

### VII. Quadratics

1. Roots
2. Real
3. Imaginary

### VIII. Metric/English Conversion

1. Metric to English
2. English to Metric

### IX. Statistics "Stats"

1. Mean
2. Mode
3. Median
4. Midrange
5. Maximum
6. Minimum
7. Number of values
8. Range
9. Standard Deviation
10. Frequency Distribution Chart
11. Percentile Chart
12. T-scores
13. z-scores

### X. Linear Algebra

1. Identify Corner Points
2. Evaluate corners
3. Find minimum/maximum
4. List constraint equations
5. List minimum/maximum equations

### XI. Matrix Algebra - "Mat"

1. Addition
2. Subtraction
3. Multiplication
4. Determinant
5. Cofactor
6. Inverse
7. Transpose
8. Identity

mhh

# THE DEVELOPMENT AND IMPLEMENTATION OF A DISTRICT COMPUTER EDUCATION PROGRAM

## APPENDIX D

## Related Activities

D1: Minutes of First Council for Computer Education Meeting

D2: Notification of Transfer of Computer Education Funds and Related Documents

D3: Announcement of an Informational Meeting Sponsored by the Council for Computer Education

D4: Documents Related to Computer Task Force

D5: House Bill 509 Proposal

D6: Motion to Board of Education to Amend the Budget for the Purchase of Computer Hardware

D7: Computer Hardware Bid Notice

D8: Purchase Order for Computer Hardware

D9: Letter Ordering Project Delta Terminals

# APPENDIX D1

## Minutes of First Council for Computer Education Meeting

STATE OF DELAWARE

DEPARTMENT OF PUBLIC INSTRUCTION
DOVER DELAWARE 19901

KENNETH C. MADDEN
STATE SUPERINTENDENT

RANDALL L. BROYLES
HOWARD E. ROW
JOHN J. RYAN
ASSISTANT SUPERINTENDENTS

February 26, 1973

MEMORANDUM

TO: Members of the Council for Computer Education

Dr. Earl Abrahamson
Dr. Robert Boozer
Mr. Arthur Bragg
Mrs. Vera Bures
Mr. Earl Carpenter
Mr. Winston Cleland
Mr. John Donahue
Mr. Edward Goate
Mr. Jack Graybeal
Mrs. Teresa Green
Mr. John Hornby
Dr. David Lamb
Mr. Dennis Loftus
Mr. Thomas Luff
Mr. Ralph Mahan
Dr. Daniel Neale
Dr. James Pugh
Mrs. Charlotte Purnell
Dr. Henry Reynolds
Dr. David Robinson
Mr. Paul Schmidt
Mr. Alex Taylor
Mr. Neil Walzl
Mrs. Rhoda Witlin
*Mr. Mort Witlin (Guest)
*Dr. David Yens (Guest)
*Mr. Andrew Allison (Guest)
Dr. Randall Broyles (Guest)

FROM: William J. Geppert
State Supervisor of Mathematics

SUBJECT: MINUTES OF FEBRUARY 22, 1973 MEETING

The meeting was opened at 1:30 p.m. by Mr. Geppert. Mr. Geppert introduced Dr. Broyles to the committee. Dr. Broyles thanked the committee for their willingness to serve on the council. He gave a brief review of computer education in the state. He then expressed the concern that the council view computer education as a total concept in the instructional program, i.e., all applications of the computer in the areas of instruction including the use of the computer in data processing application as well as computer literacy in the schools.

Funding is not forthcoming at this time, but he commented on a few items in respect to the Department. The Department budget request for computer education, a Title III ESEA

*Denotes attendance

computer proposal for lower Delaware, the use of House Bill 509 in the areas of business education, were mentioned as part of the recent involvement of the Department in computer education. The use of the computer in the process of instruction has been a rather slow development in our schools. The computer carries with it many ramifications for education. These ramifications are what the Department will be using the council for in seeking advice and recommendations for computer education in the schools.

Dr. Broyles then turned the meeting over to Mr. Geppert. Mr. Geppert commented briefly on a few of the materials for the committee's perusal. The Conference Board of the Mathematical Sciences Committee on Computer Education, Recommendations Regarding Computers in High School Education, a national study on the use of the computer in secondary schools by Charles Darby in 1971, were distributed. Mr. Geppert then shared with the committee a comparative study he had completed with Project Delta. Also, upon completion of his report to Dr. Madden on Project Delta, he would make it available for the committee at their next meeting. Mr. Geppert further elaborated on the activities in the Department with computer education. That is, the budget request, House Bill 509, the Title III ESEA computer project, and the Brown Book request.

Mr. Geppert then opened the meeting for comments and discussion of the various committee members' concerns, present activities, and their resources for computer education. A great deal of discussion ensued with participation by the members. Each person discussed his or her interest in computer education and the group reacted with questions or comments. It was found that data processing activities, computer-based instruction via Project Delta, were predominate in the present computer applications with the schools. A Computer Managerial Instruction system has been proposed in the Marshallton-McKean School District. The use of the computer in the area of guidance applications has been considered for the Career Education programs. A consortium of school districts in New Castle County have been operating the last few years in providing administrative services to its member schools. A few districts have reported their own systems for administrative use primarily with some applications for specific subjects (e.g., business education, mathematics, science).

The committee expressed a concern that Computer Education and Computer Literacy were two broadly interpreted terms. A precise definition of the terms and what they encompass should be determined for the council. Dr. Robinson pointed out, at the time, computer literacy is one of the most difficult terms to react to because of the grossly encompassing interpretations. He perceived it as a student's familiarity and ability to function in a computing environment.

Mr. Geppert pointed out that the council would operate with informal procedures, but requested that the council elect a chairman and vice-chairman for future meetings. The topics on the agenda for the council meetings are, for the most part, determined by the Department. Committee members are requested to submit items for the agenda to Mr. Geppert if they are appropriate for the council. The council's primary purpose is to advise and make recommendations on matters relative to the state department's involvement with computer education.

The council will probably not meet again till next Fall. In the event a draft for the Brown Book is requested for Fiscal Year '75, the council will be informed. Meetings of the advisory council are dependent on the state's activities in computer education. It would seem that the next few years will bring increased use of the computer into our Delaware schools.

Dr. Robinson nominated Mrs. Witlin as chairman for the council. Mr. Taylor seconded the motion. Mr. Walzl then moved that nominations be closed. It was unanimously approved Mrs. Witlin is the chairman for the committee. Mrs. Witlin in turn nominated Dr. Robinson for vice-chairman. Dr. Robinson declined. Mr. John Hornby volunteered as vice-chairman for the committee. He was unanimously approved. The meeting was adjourned at 3:30 p.m.

WJG/nlt
cc: Dr. Kenneth C. Madden
Dr. Randall L. Broyles
Mr. Edward J. Moynihan
Mr. Conrad C. Shuman

# APPENDIX D2

## Notification of Transfer of Computer Education Funds and Related Documents

NEWARK SCHOOL DISTRICT
OFFICE OF DEPUTY SUPERINTENDENT
Newark, Delaware

June 3, 1975

MEMORANDUM

TO: HIGH SCHOOL PRINCIPALS

FROM: JOHN E. ALLEN

RE: STATE AID FOR COMPUTER EDUCATION

Attached is a memorandum from William J. Geppert, State Supervisor of Mathematics, relative to proposed State aid for computer education. Neil Walsh, our own Mathematics Supervisor, had alerted me to the possibility of these funds earlier, and I have already asked him to coordinate efforts for the Newark School District in obtaining these funds. You need, therefore, take no action on an individual school basis. Bill Geppert's memorandum is provided for your information only. Neil will be working to obtain as much money as possible from any State funds which may become available to help offset local costs for computer terminals in our three high schools.

JEA/m

cc Mr. Freidly
Mrs. Bonney
Dr. Thompson
✓Mr. Walsh

STATE OF DELAWARE

DEPARTMENT OF PUBLIC INSTRUCTION
THE TOWNSEND BUILDING
DOVER, DELAWARE 19901

KENNETH C. MADDEN
STATE SUPERINTENDENT

RANDALL L. BROYLES
HOWARD E. ROW
JOHN J. RYAN
ASSISTANT SUPERINTENDENTS

May 27, 1975

MEMORANDUM

TO: Chief School Officers-Public Schools

FOR DISTRIBUTION TO: High School Principals

FROM: William J. Geppert, State Supervisor of Mathematics

SUBJECT: STATE AID FOR COMPUTER EDUCATION

The Joint Finance Committee has recommended an additional amount of $48,000 to be used to help school districts in providing computer education for the school year 1975-76. The General Assembly and the Governor will have to approve and sign the Budget Bill. However, we are assuming at this point that the monies will be made available. The money was determined by the total number of public high schools in the State. (32 high schools @ $1,500 per school = $48,000). It is our understanding at this point that the money will be distributed in the following manner:

Each high school in the State can qualify for an amount up to a maximum $1,500 from the state fund on a matching basis (i.e., local high school requests $2,600 for computer education--$1,300 will be used from the local district funds and $1,300 will be granted from the state fund for computer education). This is similar to NDEA Title III funding.

The monies will be made available and disbursed to schools who voluntarily wish to support computer education. Many of the high schools in the State are presently involved with the Delaware School Auxiliary Association Computer Project "Delta." It is projected that the costs for the school year 1975-76 will be $3,000 in that project. The state funds are not limited to a project but must be used in purchasing, leasing, or rental of computer hardware and software in the schools for computer education.

Guidelines will be prepared which will incorporate the above statements in anticipation of the approved budget.

Since this represents an initial effort by the State, the Department is requesting additional data at this time concerning your request for these funds. If your district is planning to request funds for computer education, please indicate on the tear sheet provided. Your cooperation in returning this form by July 1, 1975, will be appreciated.

WJG/va

CC: Dr. Madden
Dr. Broyles
Dr. Wachter

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## TEAR SHEET

District Newark School District

1. Plan to use state funds for computer education. ( x) yes ( ) no

2. Request $ 40,000. from state funds. (An equal amount will be matched from local funds).

3. Type of equipment:

   (X ) Computer (mini-computer, etc.)
   (X ) Computer terminal
   ( ) Programmable calculators
   ( ) Other (specify equipment)

4. Use of computer in instructional program. Check one or more which apply.

   ( X) Teaching computer skills (Programming)
   ( X) Using the computer for problem solving
   ( X) Using the computer for modeling and simulation
   ( ) Tutorial uses of the computer (CAI)
   ( ) Instructional diagnosis by means of the computer (CMI)
   ( X) Computer oriented for all students
   ( x) Vocational and technical training(For approved HB509 Program)
   ( X) Guidance package

F. Neil Walzl

Name F. Neil Walzl, Supervisor of Mathematics

School Office of Instruction, Newark School District

Date June 12, 1975

(For Christiana, Newark, and Glasgow High Schools)

FORM NO 1F1

To: Dr Thompson
Mr. Maslin

From: Office of Deputy Supt.

# STATE OF DELAWARE

OFFICE OF BUDGET DIRECTOR

RECEIVED
SEP 8 9 15 AM '75

No. 50

DATE September 5, 1979

☐ GENERAL FUND APPROPRIATION
☒ GENERAL FUND CONTINGENCY AND, OR, EMERGENCY FUND
☑ SPECIAL FUND

Public Education 95
DEPARTMENT

Department of Public Instruction 01
DIVISION

Administration 001
SECTION

FISCAL YEAR ENDING JUNE 30, 197 6

| FROM | | | | | | | | TO | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCOUNT TITLE | DEPT | DIV | SECT | FUND | LINE | FUNCTION | PROGRAM | ACCOUNT TITLE | DEPT | DIV | SECT | FUND | LINE | FUNCTION | PROGRAM | AMOUNT | T/C |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | Mt. Pleasant Computer Ed. | 95 | 19 | 000 | 01 | 82 | | | 1,500.00 | 17 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | N.C.-V. T. Computer Ed. | 95 | 38 | 000 | 01 | 82 | | | 1,500.00 | 17 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | N.C.-G.B. Computer Ed. | 95 | 20 | 000 | 01 | 82 | | | 1,500.00 | 17 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | Newark Computer Ed. | 95 | 21 | 000 | 01 | 82 | | | 4,500.00 | 17 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | Seaford Computer Ed. | 95 | 23 | 000 | 01 | 82 | | | 1,500.00 | 17 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | Smyrna Computer Ed. | 95 | 24 | 000 | 01 | 82 | | | 1,500.00 | 17 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | Stanton Computer Ed. | 95 | 33 | 000 | 01 | 82 | | | 1,500.00 | 17 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | Sussex Vo Tech Computer Ed. | 95 | 40 | 000 | 01 | 82 | | | 1,500.00 | 17 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 | | | Computer Ed. Wilmington | 95 | 25 | 000 | 01 | 82 | | | 4,500.00 | 17 |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

TOTAL $ 19,500.00

I HEREBY CERTIFY THAT THE ABOVE REQUESTED TRANSFER IS NECESSARY FOR THE FOLLOWING REASONS:

See Attached memo from Mr. Geppert to Dr. Madden.

Neil

WB Robert L. Durkee

TITLE Director of Finance

DATE September 5, 1975

APPROVED: DATE 9-22-75

Controller General

BUDGET DIRECTOR
FORM NO. 171

To: Miss Wolf
Dr. Thompson
[illegible]

Office of Deputy [illegible]

# STATE OF DELAWARE

OFFICE OF BUDGET DIRECTOR

**REQUEST FOR TRANSFER**

RECEIVED
OCT 9 3 13 PM '75
BUDGET DIRECTOR

No. ___

DATE October 6, 197

☐ GENERAL FUND APPROPRIA
☒ GENERAL FUND CONTINGE AND, OR, EMERGENCY FU
☐ SPECIAL FUND

Public Education 95
DEPARTMENT

Department of Public Instruction 01
DIVISION

Administration 001
SECTION

FISCAL YEAR ENDING JUNE 30, 197 6

| FROM |  |  |  |  |  |  |  | TO |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCOUNT TITLE | DEPT | DIV. | SECT. | FUND | LINE | FUNCTION | PROGRAM | ACCOUNT TITLE | DEPT | DIV. | SECT. | FUND | LINE | FUNCTION | PROGRAM | AMOUNT |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Alfred I. DuPont Computer Ed. | 95 | 26 | 000 | 01 | 82 |  |  | 3,000.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Alexis I. DuPont Computer Ed. | 95 | 14 | 000 | 01 | 82 |  |  | 3,000.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Computer Ed. Capital | 95 | 13 | 000 | 01 | 82 |  |  | 1,500.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Conrad Computer Ed. | 95 | 30 | 000 | 01 | 82 |  |  | 1,200.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Kent Vo Tech Computer Ed. | 95 | 39 | 000 | 01 | 82 |  |  | 1,000.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Newark Computer Ed. | 95 | 21 | 000 | 01 | 82 |  |  | 2,000.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Seaford Computer Ed. | 95 | 23 | 000 | 01 | 82 |  |  | 100.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Smyrna Computer Ed. | 95 | 24 | 000 | 01 | 82 |  |  | 200.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Sussex Vo Tech Computer Ed. | 95 | 40 | 000 | 01 | 82 |  |  | 1,000.00 |
| Computer Ed. | 95 | 01 | 002 | 01 | 82 |  |  | Wilmington Computer Ed. | 95 | 25 | 000 | 01 | 82 |  |  | 1,500.00 |

TOTAL $ 14,500.00 ✓

I HEREBY CERTIFY THAT THE ABOVE REQUESTED TRANSFER IS NECESSARY FOR THE FOLLOWING REASONS:

Computer Ed. money for use in approved program and to be matched by the local districts.

Robert I. Dunker

TITLE Director of Finance

DATE October 6, 1975

DO NOT USE THIS SPACE

ANALYST

APPROVED: DATE 10-21

BUDGET DIRECTOR

Controller

RECEIVED
DEPT. PUBLIC INSTRUCTION
1975 SEP 23 AM 10: 34

339

# APPENDIX D3

## Announcement of an Informational Meeting Sponsored by the Council for Computer Education

STATE OF DELAWARE

DEPARTMENT OF PUBLIC INSTRUCTION

DOVER, DELAWARE 19901

KENNETH C. MADDEN
STATE SUPERINTENDENT

RANDALL L. BROYLES
HOWARD E. ROW
JOHN J. RYAN
ASSISTANT SUPERINTENDENTS

November 7, 1973

TO: Members of the Council for Computer Education

Dr. Earl Abrahamson
Dr. Robert Boozer
Mr. Arthur Bragg
Mrs. Vera Bures
Mr. Earl Carpenter
Mr. Winston Cleland
Mr. John Donahue
Mr. Edward Goate
Mr. Jack Graybeal
Mrs. Teresa Green
Dr. David Lamb
Mr. Dennis Loftus
Mr. Thomas Luff
Mr. Ralph Mahan
Dr. Daniel Neale
Dr. James Pugh
Mrs. Charlotte Purnell
Dr. Henry Reynolds
Dr. David Robinson
Mr. Paul Schmidt
Mr. Alex Taylor
Mr. Neil Walzl
Mrs. Rhoda Witlin
Mr. John Hornby

FROM: William J. Geppert
Supervisor of Mathematics

SUBJECT: DECEMBER 6, 1973 MEETING

Happy Thanksgiving!!

The first meeting of the Council will be held Thursday, December 6, 1973 from 1:00-3:00 p.m., at the Hub Restaurant in Dover.

In an effort to stimulate and encourage interest in computer education, the State Department of Public Instruction, in cooperation with the Del Mod System, will sponsor a presentation by the TIES Project for school districts in Delaware.

The presentation will be the main topic on the agenda. Attached is a copy of the notice sent to the Chief School Officers. Please complete the attached form and return.

WJG/scp
Attachment

cc: Dr. Kenneth C. Madden
Dr. Randall L. Broyles
Mr. Edward J. Moynihan

STATE OF DELAWARE

DEPARTMENT OF PUBLIC INSTRUCTION
THE TOWNSEND BUILDING
DOVER, DELAWARE 19901

KENNETH C. MADDEN
STATE SUPERINTENDENT

RANDALL L. BROYLES
HOWARD E. ROW
JOHN J. RYAN
ASSISTANT SUPERINTENDENTS

October 25, 1973

MEMORANDUM

TO: Chief School Officers

FOR: School Finance and Administration Personnel
District Instructional Personnel
Secondary School Principals

FROM: William J. Geppert, State Supervisor of Mathematics
John F. Reiher, State Supervisor of Science and Environmental Education

SUBJECT: TIES PRESENTATION IN COMPUTER EDUCATION

In an effort to stimulate and encourage interest in computer education, the State Department of Public Instruction, in cooperation with the Del Mod System, is pleased to announce a presentation by the TIES Project for school districts in Delaware.

In 1967, twenty Minnesota school districts formed the Minnesota School Districts Data Processing Joint Board and established a unique educational service called Total Information for Educational Systems - TIES. Philosophically, the Joint Board had determined that a regional, cooperative data center (utilizing the most advanced computer concepts and capabilities) was its necessary objective. The information system would pursue development and produce services in three major functional areas - administration, instruction and research. TIES is an established on-line information system, utilizing telecommunications, an integrated data base and advanced information systems concepts. Described as "the most complex and sophisticated educational computer system in the country," TIES is now providing administrative, instructional and research services for over 325 schools which enroll approximately 300,000 students in Minnesota and Illinois.

The first presentation will be held Thursday, December 6, 1973, at the Hub Restaurant in Dover, from 1:00 - 3:00 P.M., for Kent and Sussex Counties school personnel.

A second presentation will be held Friday morning, December 7, 1973, at the Ramada Inn (off I-95) in Wilmington, from 9:30 - 11:30 A.M., for New Castle County school personnel.

We are hoping to expose as many school administrators as possible to the TIES System. The TIES concept represents a dramatic departure from most current practices. Its concept is that people come first - systems second - and hardware third. All three can be integrated into a total system for education. Dr. Thomas C. Campbell, a former school administrator and now Executive Director of the Minnesota School Districts Data Processing Joint Board, will conduct the presentations.

To enable us to more clearly determine the number of people attending, please complete the form below and return to this office on or before November 21, 1973.

Thank you.

WJGjr:rie
cc: Dr. Kenneth C. Madden, Superintendent
Dr. Randall L. Broyles, Assistant Superintendent
Mr. Edward J. Moynihan, Director of Secondary Education
Mrs. Charlotte Purnell, Director of Del Mod System

---

Return on or before November 21, 1973, to Mr. Thomas M. Baker, State Department of Public Instruction

| NAME | POSITION | SCHOOL DISTRICT |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

MAR 24 1975

STATE OF DELAWARE

DEPARTMENT OF PUBLIC INSTRUCTION
THE TOWNSEND BUILDING
DOVER, DELAWARE 19901

KENNETH C. MADDEN
STATE SUPERINTENDENT

RANDALL L. BROYLES
HOWARD E. ROW
JOHN J. RYAN
ASSISTANT SUPERINTENDENTS

March 18, 1975

MEMORANDUM

TO: Administrators for Computer Education Members

FROM: William J. Geppert, State Supervisor of Mathematics

SUBJECT: APRIL 18, 1975 LUNCHEON MEETING

The second meeting of the Council for Computer Education will be held Friday, April 18, 1975, beginning at 10:15 A.M. in the Sheraton Motor Inn at Dover. A copy of the agenda is attached.

Your support is appreciated in making your staff member, Neil Walzl, who is a member of the Council, available to attend the meeting. This is a luncheon meeting provided by computer hardware vendors for the Council.

A separate announcement of the presentation and demonstration of hardware equipment by Wang Laboratories for all school districts Friday afternoon will be sent to you shortly.

Thank you for your support in the Council's activities.

WJG/va

cc: Dr. Kenneth C. Madden
Dr. Randall L. Broyles
Dr. Donald H. Wachter

Attachments

STATE OF DELAWARE

## DEPARTMENT OF PUBLIC INSTRUCTION

THE TOWNSEND BUILDING
DOVER, DELAWARE 19901

KENNETH C. MADDEN
STATE SUPERINTENDENT

RANDALL L. BROYLES
HOWARD E. ROW
JOHN J. RYAN
ASSISTANT SUPERINTENDENTS

March 18, 1975

MEMORANDUM

TO: Members of Council for Computer Education

Dr. Earl Abrahamson
Dr. Robert Boozer
Mr. Arthur Bragg
Ms. Vera Bures
Mr. Anthony Wolanski
Mr. Winston Cleland
Mr. John P. Donahue
Dr. Edward W. Goate
Mr. Jack D. Graybeal
Mrs. Teresa Green
Dr. David Lamb
Dr. William Curlott
Mr. Thomas Luff
Mr. Ralph Mahan
Dr. Daniel C. Neale
Dr. James Pugh
Mrs. Charlotte H. Purnell
Dr. Henry Reynolds
Dr. David Robinson
Mr. Paul Schmidt
Mr. Andrew Allinson
Mr. Neil Walzl
Mrs. Rhoda Witlin
Mr. John D. Hornby
Mr. Morton Witlin

FROM: William J. Geppert, State Supervisor of Mathematics

SUBJECT: LUNCHEON MEETING--APRIL 18, 1975

The second meeting of the Council for Computer Education will be held Friday, April 18, 1975, beginning at 10:15 A.M. at the Sheraton Motor Inn in Dover. The agenda will be as follows:

| | |
|---|---|
| 10:15 - 12:00 | UNIVAC--presentation of a CAI program used in the Chicago Public Schools |
| 12:00 - 1:00 | Luncheon (Courtesy of the Vendors) |
| 1:15 - 3:15 | Wang Lab presentation and demonstration of computer equipment. (All school districts will be invited to participate in the afternoon session). |

Sometime in between we will have a short meeting with the Council.

Please plan to attend the meeting!!

WJG/va

cc: Dr. Kenneth C. Madden
Dr. Randall L. Broyles
Dr. Donald H. Wachter

---

RETURN TO WILLIAM GEPPERT ON OR BEFORE APRIL 15, 1975.

My choice for the luncheon is: _______ Broiled Flounder
_______ Dover Mixed Grill

Name ________________________________________

# APPENDIX D4

Documents Related to Computer Task Force

## TASK FORCE-TIME LINE

## STATE PLAN FOR USE OF COMPUTER IN EDUCATION

| | |
|---|---|
| July, 1975 | Initial meeting and organization of Task Force members |
| August, 1975 | Two meetings |
| September, 1975 | Two meetings |
| October, 1975 | Two meetings (tentative deadline) Completion of final working draft for submission to various groups in education community |
| November, 1975 | Submit working draft to other state agencies for further input |
| January, 1976 | Completion of final draft with appropriate review, revisions, additions and deletions by various groups |
| February, 1976 | Submit plan to State Board of Education |

WJG/va
7-24-75

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

August 27, 1975

MEMORANDUM TO: Dr. Loren Thompson

FROM: F. Neil Walzl FNW

RE: State Plan for Use of Computers in Education (William Geppert's memo of 6/26/75)

Bill Geppert, State Supervisor of Mathematics, has formed a task force to study this problem and to formulate a five year plan for computer education for the state.

Tom Martin and I have been asked to serve on this committee. Other committee members are Ron Nichols, DICE; Teresa Green, Project DELTA; Dave Robinson, Project DELTA; Vera Burris, Kent County Vo-Tech; Earl Abrahamison, Mount Pleasant School Board; and Robert Boozer, DPI.

We met once in August as a full committee to discuss the problem and at that point decided to work as three sub-committees. These are: instructional usages, administrative usages, and state involvement. I am serving on the instructional sub-committee and Tom Martin is serving on the administrative sub-committee.

Our next full committee meeting will be held on September 12. At that time each sub-committee expects to have some ideas for a five year plan for their area. I will keep you posted on further developments.

If you have any questions, let me know.

FNW:bap

cc: Dr. Allen

# APPENDIX D5

## House Bill 509 Proposal

DRAFT

OK

## ATTACHMENT #1

Course #1 - Introduction to Data Processing and Computer Careers
(03.17010000)/(03.17040000)

Course #2 - Data Processing Systems and Introductory Computer Programming
(03.17020000)/(03.17040000)

Course #3 - Computer Oriented Mathematics and Advanced Computer Programming I
(03.17030000)/(16.04010000)/(03.17040000)

Course #4 - Advanced Computer Programming II
(03.17040000)/(16.04020000)

---

| | Time | # Students | Minutes/Week | Total Minutes |
|---|---|---|---|---|
| Course #1 | 9 wks. | 250 | 250 | 15,625 |
| Course #2 | 18 wks. | 50 | 250 | 6,250 |
| (additional lab) | | 50 | 50 | 1,250 |
| Course #3 | 36 wks. | 25 | 250 | 6,250 |
| (additional lab) | | 25 | 50 | 1,250 |
| Total Pupil Minutes | | | | 30,625 |
| Units | | | | 1.13 |

To be implemented in 1976

| | Time | # Students | Minutes/Week | Total Minutes |
|---|---|---|---|---|
| Course #4 | 36 wks | 15 | 250 | 3,750 |
| (additional lab) | | 15 | 100 | 1,500 |
| Total Pupil Minutes | | | | 5,250 |

mhh
12/10/74

## ATTACHMENT #2

Program Title: Data Processing and Computer Programming

8A. Statement of Purpose

The purpose of this program is to enable a student to become acquainted with developments in data processing, computer programming techniques, the interaction of mathematics and the computer, and a knowledge of the job requirements necessary to enter the data processing and computer programming fields.

8B. Need of Instruction

In today's computer oriented society, students in the business world need both basic knowledge and skills of computers and data processing to function effectively and efficiently.

Students interested in further education in technical skill areas need this knowledge as a basic skill. In short, there is a demand for people who have both mathematical and computer skills in all fields.

8C. Specific Objectives of the Program

a. To develop an understanding of computer knowledge and skills necessary in the business and technical areas.

b. To apply and extend mathematical skills using the computer and data processing techniques as the vehicle.

c. To develop basic job entry skills and knowledge for the fields of data processing and computer programming.

d. To develop positive attitudes about the role and function of computers and their operations.

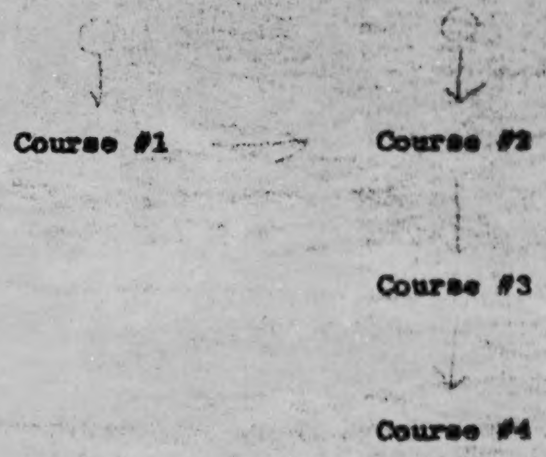
Attachment #2 (Cont'd.)

8C. e. To develop the basic skills necessary to function efficiently and effectively as a consumer in a computer oriented world.

f. To develop an understanding of the various employment opportunities and job requirements for all levels of direct and indirect computer utilization.

mhh
12/10/74

# SCHEMATIC OF COURSE HEIRARCHY


Course #1
Course #2
Course #3
Course #4

Suggested Grade Level Placement of Courses

Course #1, Grades 9 or 10

Course #2, Grades 10 or 11

Course #3, Grades 11 or 12

Course #4, Grade 12

mhh
12/10/74

DELAWARE DEPARTMENT OF [illegible]
LETTER OF INTENT FORM FOR
FEDERAL AND STATE ASSISTANCE PROGRAMS

Directions: Prepare and submit original and one copy

Check Appropriate Items:

| | PROGRAM NEW | PROGRAM CONTINUING |
|---|---|---|
| ESEA Title I (P.L. 89-313) Handicapped | | |
| ESEA Title II | | |
| ESEA Title III | | |
| Education of the Handicapped Act (Part B, P.L. 91-230) | | |
| Vocational Programs: | | |
| Regular Occup/Voc. | X | |
| Summer Occup/Voc. | | |
| Federal | | |
| NDEA Title III | | |

A. DPI USE ONLY

Date Rec/d ________

Fiscal Year ________

Total Units ________

Descriptive Project Title...USOE Code
Data Processing & Computer
Programming (USOE Code - See Attached)

3. Educational Agency(s) - Address
Newark School District
83 East Main Street
Newark, Delaware 19711

Project Location(s) - Address
(Name of School, etc.)
Glasgow High School
1901 South College
Newark, Delaware 19711

B. DPI USE ONLY (Signature and Date)

________
State Supervisor

________
State Director

________
Assistant State Superintendent

Project Area
(Occupational/Vocational/
Curricular)
Occup/Voc.
Business - Technical
Other (Math related)

Duration of Project
From: 9/1/75
To: 6/30/76

| 6. Program Level | Participants Sub Total | Participants Grand Total | Instruction Min/wk (Voc. only) |
|---|---|---|---|
| Elementary Ed. | | | |
| a. Handicapped | | | |
| b. Disadvantaged | | | |
| Secondary Ed. | | See Attached | |
| a. Handicapped | | | |
| b. Disadvantaged | | | |
| Special Schools | | | |
| Post Secondary | | | |
| a. Apprentice | | | |
| b. Trade Extension | | | |
| Adult Education | | | |
| a. Handicapped | | | |
| b. Disadvantaged | | | |

Total Project Cost
$10,087.10

C. DPI USE ONLY

Approved ☐

Approved with Conditions ☐

Rejected ☐

Narrative

Please follow attached format (not to exceed two typewritten pages).

CIVIL RIGHTS: We assure Compliance with Title VI and Title VII of the Civil Rights Act of (P.L. 88-352) Title IX of the Education Amendments of 1972 (P.L. 92-318) and all requirements imposed by or pursuant to the Regulations of the Department of HEW (45 CFR Part 80).

________
Chief School Administrator (Signature & Date)

for Francis J. Higgins 1/14/75
Local Contact Person (Signature & Date)

# ATTACHMENT #1

Course #1 - Introduction to Data Processing and Computer Careers
(03.17010000)/(03.17040000)

Course #2 - Data Processing Systems and Introductory Computer Programming
(03.17020000)/(03.17040000)

Course #3 - Computer Oriented Mathematics and Advanced Computer Programming I
(03.17030000)/(16.04010000)/(03.17040000)

Course #4 - Advanced Computer Programming II
(03.17040000)/(16.04020000)

---

| | Time | # Students | Minutes/Week | Total Minutes |
|---|---|---|---|---|
| Course #1 | 9 wks. | 250 | 250 | 15,625 |
| Course #2 | 18 wks. | 50 | 250 | 6,250 |
| (additional lab) | | 50 | 50 | 1,250 |
| Course #3 | 36 wks. | 25 | 250 | 6,250 |
| (additional lab) | | 25 | 50 | 1,250 |
| Total Pupil Minutes | | | | 30,625 |
| Units | | | | 1.13 |

To be implemented in 1976

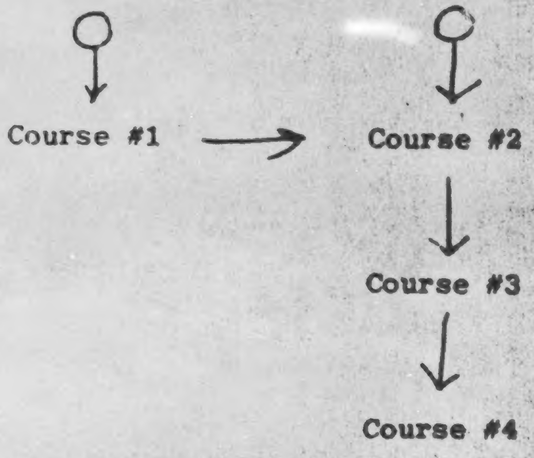
| | Time | # Students | Minutes/Week | Total Minutes |
|---|---|---|---|---|
| Course #4 | 36 wks | 15 | 250 | 3,750 |
| (additional lab) | | 15 | 100 | 1,500 |
| Total Pupil Minutes | | | | 5,250 |

mhh
12/10/74

LETTER OF INTENT FORM - Format for completing No. 8, Narrative

| MAJOR PROBLEM(S) (NEEDS ASSESSMENT-GOAL) | MAJOR OBJECTIVES FOR 19 -19 | MAJOR ACTIVITIES | EVALUATION PROCEDURES |
|---|---|---|---|
| In today's computer oriented society, students in the business world need both basic knowledge and skills of computers and data processing to function effectively and efficiently. Students interested in further education in technical skill areas need this knowledge as a basic skill. In short, there is a demand for people who have both mathematical and computer skills in all fields. | 1.0 To develop an understanding of computer knowledge and skills necessary in the business and technical areas. | 1.0 Students will be exposed to the many and various uses of computers in science business, and industry through readings, speakers, field trips and research. | 1.0 Students will be evaluated by staff developed criterion-referenced test. |
| | 1.1 To apply and extend mathematical skills using the computer and data processing techniques as the vehicle. | 1.2 Students will develop skills in mathematics and problem solving through flowcharting, program coding and on-line computer testing of computer programs. | 1.2 Students ability to start, clear, enter operate and end operation with a computer. |
| | 1.2 To develop basic job entry skills and knowledge for the fields of data processing and computer programming. | | 1.3 Actual printed results of programs written and run with solutions. |
| The purpose of this program is to enable a student to become acquainted with developments in data processing, computer programming techniques, the interaction of mathematics and the computer, and a knowledge of the job requirements necessary to enter the data processing and computer programming fields. | | 1.3 Students will operate and enter pre-written programs in order to interact with various simulations. | |
| | 1.3 To develop positive attitudes about the role and function of computers and their operations. | 1.3 Students will be exposed to job and career operations through readings, speakers, field trips and research. | |
| | 1.4 To develop an understanding of the various employment opportunities and job requirements for all levels of direct and indirect computer utilization. | | |

# SCHEMATIC OF COURSE HEIRARCHY


Course #1
Course #2
Course #3
Course #4

Suggested Grade Level Placement of Courses

Course #1, Grades 9 or 10

Course #2, Grades 10 or 11

Course #3, Grades 11 or 12

Course #4, Grade 12

mhh
12/10/74

DELAWARE DEPARTMENT OF PUBLIC INSTRUCTION
LETTER OF INTENT FORM FOR
FEDERAL AND STATE ASSISTANCE PROGRAMS

[illegible]

1. Application made from:

| | PROGRAM NEW | PROGRAM CONTINUING |
|---|---|---|
| ESEA Title I (P.L. 89-313) Handicapped | ___ | ___ |
| ESEA Title II | ___ | |
| ESEA Title III | ___ | ___ |
| Education of the Handicapped Act (Part B, P.L. 91-230) | ___ | ___ |
| Vocational Programs: | | |
| Regular Occup/Voc. | X | ___ |
| Special Occup/Voc. | ___ | |
| Federal | ___ | ___ |
| NDEA Title III | ___ | |

A. DPI USE ONLY

Date Rec/d ____________

Fiscal Year ____________

Total Units ____________

2. Descriptive Project Title...USOE Code

Data Processing and Computer
Programming 14.0201 & 14.0203 14.0204

3. Educational Agency(s) - Address

Newark School District
Newark, Delaware 19711

4. Local Agency(ies) - Address
(Name of school, etc.)

Glasgow High School
1901 South College Avenue
Newark, Delaware 19711

B. DPI USE ONLY (Signature and Date)

____________
State Supervisor

____________
State Director

____________
Assistant State Superintendent

5. Program
(Occupational/Vocational/Curricular)

Occupational/Vocational
Business Education

Duration of Project

From: 9/1/75

To: 6/30/76

| 6. Program Level | Participants Sub Total | Participants Grand Total | Instruction Min/Wk (Voc. only) | Total Project Cost |
|---|---|---|---|---|
| Elementary Ed. | | | | |
| a. Handicapped | | | | $11,535.18 |
| b. Disadvantaged | | | | |
| Secondary Ed. | | SEE ATTACHED | | C. DPI USE ONLY |
| a. Handicapped | | | | |
| b. Disadvantaged | | | | Approved ☐ |
| Special Schools | | | | |
| Post Secondary | | | | Approved with Conditions ☐ |
| a. Apprentice | | | | |
| b. Trade Extension | | | | |
| Adult Education | | | | Rejected ☐ |
| a. Handicapped | | | | |
| b. Disadvantaged | | | | |

Narrative

Please follow attached format (not to exceed two typewritten pages).

[illegible] assure compliance with Title VI and Title VII of the Civil Rights Act of 1964 (P.L. 88-352) Title IX of the Education Amendments of 1972 (P.L. 92-318) and all requirements imposed by or pursuant to the Regulations of the Department of HEW (45 CFR Part 80).

Chief School Administrator (Signature & Date)

Francis J Higgins 11/30/75
Local Contact Person (Signature & Date)

## PROGRAM COMPONENTS

|  | Time | # Students | Minutes/Wk. | Total Minutes |
|---|---|---|---|---|
| Course #1 | 9 Wks. | 250 | 250 | 15,625 |
| Course #2 | 18 Wks. | 50 | 250 | 6,250 |
| (additional lab) |  | 50 | 50 | 1,250 |
| Total Pupil Minutes |  |  |  | 23,125 |
| Units |  |  |  | 0.86 |
| Implemented in 1976 |  |  |  |  |
| Course #3 | 36 wks. | 25 | 250 |  |
| (additional lab) |  | 25 | 50 |  |
| Implemented in 1977 |  |  |  |  |
| Course #4 | 36 wks. | 15 | 250 |  |
| (additional lab) |  | 15 | 100 |  |

LETTER of INGENT FORM - Format for completing No. 8, Narrative

| MAJOR PROBLEM(S) (NEEDS ASSESSMENT-GOAL) | MAJOR OBJECTIVES FOR 19 -19 | MAJOR ACTIVITIES | EVALUATION PROCEDURES |
|---|---|---|---|
| In today's computer oriented society students in the business machines world need both basic knowledge and skills of computers and data processing to function effectively and efficiently. Students interested in further education in technical skill areas need this knowledge as a basic skill. In short, there is a demand for people who have both mathematical and computer skills in all fields. | 1.0 To develop an understanding of computer knowledge and skills necessary in the business and technical areas. | 1.0 Students will be exposed to the many and various used of computers in science business, and industry through readings, speakers, field trips and research. | 1.0 Students will by staff developed criterion-references test. |
| | 1.1 To apply and extend mathematical skills of business students using the computer and data processing techniques as the vehicle. | 1.2 Students will develop skills in mathematics and problem solving through flowcharting, program coding and on-line computer testing of computer programs. | 1.2 Students ability to start, clear, enter, operate and end operation with a computer. |
| The purpose of this program is to enable a student to become acquainted with developments in data processing, computer programming techniques, the interaction of mathematics and the computer, and a knowledge of the job requirements necessary to enter the data processing and computer programming fields. | 1.2 To develop basic job entry skills and knowledge for the fields of data processing and computer programming. | 1.3 Students will operate and enter pre-written programs in order to interact with various simulations. | 1.3 Actual printed results of programs written and run with solutions. |
| | 1.3 To develop positive attitudes about the role and function of computers and their operations. | 1.3 Students will be exposed to job and career operations through readings, speakers, field trips and research. | |
| | 1.4 To develop an understanding of the various employment opportunities and job requirements for all levels of direct and indirect computer utilization. | | |

## TOTAL PROPOSED PROGRAM COST

Average Teacher Salary

State $9288

Local $2040

Program Pupil Minutes/Week

| | Units | Costs |
|---|---|---|
| Division I | 0.86 | $7,987.68 |
| Division II (3) (Level) | 2.58 | $3,547.50 |
| TOTAL | X | $11,535.18 |

JUN 23 1975

To: Mr. Higgins

From: Office of Deputy Supt.

RECEIVED
JUN 24 1975
Newark School Dist.
Office of Deputy Supt.

STATE OF DELAWARE
DEPARTMENT OF PUBLIC INSTRUCTION
THE TOWNSEND BUILDING
DOVER, DELAWARE 19901

KENNETH C. MADDEN
STATE SUPERINTENDENT

RANDALL L. BROYLES
HOWARD E. ROW
JOHN J. RYAN
ASSISTANT SUPERINTENDENTS

DISTRIBUTION: Action x Info. ✓
Allen x
Thompson ✓

Distributed: 6/24/75
File ✓ Follow Up

June 19, 1975

Dr. George V. Kirk
Superintendent
Newark School District
83 East Main Street
Newark, Delaware 19711

Dear Dr. Kirk:

The State Board of Education at its meeting on June 19, 1975, approved the following supplemental list of occupational-vocational programs (H.B. 509) and units:

| School | Program Code | Program | Units |
|---|---|---|---|
| Glasgow High | 09.0201 | Child Care | 1.95 |
| | 14.0204 | Data Processing and Computer Programming | .87 |
| | 17.9900 | Occupational Theater | .88 |
| | | | 3.70 |

Please include this addendum with your original listing. Should there be further questions, please contact Mr. Conrad C. Shuman, Director of Vocational Education, under whose direction the programs were approved and funds allocated.

Sincerely,

Randall Broyles

Randall L. Broyles
Assistant State Superintendent
Instructional Services Branch

RLB:egb

cc: Conrad C. Shuman

# APPENDIX D6

## Motion to Board of Education to Amend the Budget for the Purchase of Computer Hardware

NEWARK SCHOOL DISTRICT
OFFICE OF DEPUTY SUPERINTENDENT
Newark, Delaware

May 5, 1975

MEMORANDUM

TO: DR. KIRK

FROM: JOHN E. ALLEN

RE: COMPUTER EDUCATION AND COLLEGE AND CAREER SELECTION PROGRAM

I would like to recommend an amendment to the District Budget to provide $80,000 to purchase computer systems for Christiana High School and Newark High School comparable to the system now in operation in Glasgow High School. Acquisition of this equipment would make it possible to offer comparable programs in data processing and computer education in all three high schools. The computer system at Glasgow High School has been in operation during the current school year and has been evaluated by the staff at Glasgow, as well as Mr. Neil Walzl, District Math Supervisor. It has been judged to be a successful and satisfactory approach to computer education. The cost of providing comparable service through Project Delta would be $12,000 per school per year; cost of the equipment would thus be amortized in four years.

I would recommend continuing participation in Project Delta by providing one terminal in each high school so that we may participate in any unique programs which Project Delta provides, particularly the college and career selection program which would be used in the high school guidance program. This computerized guidance program was utilized on a trial basis at Christiana High School last year and is highly endorsed by the guidance staff.

I believe by providing computers and terminals at Christiana and Newark similar to the one at Glasgow and by participating in Project Delta through one terminal at each high school we will be able to offer an extensive and effective computer education program.

JEA/m

# APPENDIX D7

## Computer Hardware Bid Notice

NEWARK SCHOOL DISTRICT
OFFICE OF DEPUTY SUPERINTENDENT
Newark, Delaware

May 22, 1975

MEMORANDUM

TO: MR. WALZL

FROM: JOHN E. ALLEN

RE: COMPUTORS FOR NEWARK AND CHRISTIANA HIGH SCHOOLS

I would like for you to be responsible for getting specifications developed and working with Bill Maurer to obtain bids for the computors at Christiana and Newark High Schools. I think you should consult with the Heads of the Math Departments and the Principals at those schools to be sure that there is agreement as to the kind of equipment we are purchasing. I presume we will purchase equipment either exactly like Glasgow's or comparable to it. In the event something other than the Wang system is considered I would like for that to be brought to my attention for approval before the specs go out.

I would also like for you to make arrangements with Theresa Green for our participation in Project Delta at all three high schools. We would need to have one terminal in each high school located for use by the Guidance Department with the Career and College Selection Program. Coordinate this with the Principals and Guidance Departments of the respective high schools.

Please keep me informed as you move ahead with these projects.

JEA/m

cc Mrs. Bonney
Dr. Thompson
Mr. Freidly
Dr. Auletto

**NEWARK SCHOOL DISTRICT**
**Newark, Delaware**

# REQUEST FOR QUOTATIONS

**QUOTATION REQUEST**
**No.** 52775

**QUOTATION MUST BE IN**
**BY** June 25, 1975
11:00 AM local time

**TAX EXEMPT**

---

Please quote your lowest net price F.O.B. Newark School District, Newark, Delaware for the items described below. No charge will be allowed for packing or cartage. If a vendor cannot quote on the items listed and wishes to substitute goods of equal quality, complete descriptions should be given of the proposed substitutions. In cases where a general description of items is offered to the vendor, he should identify his merchandise by listing manufacturer's model number, etc.

**PRICES MUST BE FIRM**

| ITEM | QUANTITY | DESCRIPTION | UNIT PRICE | DISCOUNT | NET PRICE |
|---|---|---|---|---|---|

FOUR USER COMPUTER SYSTEM - CHS & NHS -
UPGRADE OF EXISTING SYSTEM AT GHS

1. Two 4-User Computer System for CHS and NHS and upgrade of existing system at GHS as per attached specifications.
2. Instructions to Bidders are an integral part of this quotation request.
3. A Bid Bond or Certified Check will be required to accompany your bid for 10% of the total amount of your bid.
4. If you are the successful bidder, a Performance Bond for 100% of your total bid will be required.
5. Bid to include instruction time to be provided at each school.
6. Bid price to include annual preventative maintenance contract for 1 year from date of installation.
7. Sealed envelopes containing the bid shall carry a clear quotation in the lower left quadrant:

   Bid: Four User Computer System
   Due: June 25, 1975 11:00 AM local time

8. Address bid to:

   Mr. W. L. Maurer, P.A.
   Newark School District
   83 E. Main St.
   Newark, DE 19711

Attachments:
Cover Letter (2)
Specifications (2)
Instructions to Bidders (1)

## THIS IS NOT AN ORDER

---

To: Office of the Superintendent of Schools, Newark School District, Newark, Delaware
We quote you F.O.B., Newark School District

FIRM

Signed By

Date

Time required for delivery from receipt of order

The right to reject all or any part of this proposal is reserved by the Board of Education of the Newark School District.

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE 19711

QR #52775

Please submit brochure on
any item you are bidding.

Four-User Computer System

Date

Vendor

Address

City State Zip

Area Code Telephone

| Item | Description | Quantity | Unit Price | Total Price |
|---|---|---|---|---|

Four User Computer System each unit completely independent of the others. Each central processing unit (CPU) must have at least 4096 bytes of memory, expandable in 4096 increments 32,588 bytes. An edit feature must be wired into the CPU. The CPU must support the following peripheral devices: cathode ray tube display (16 lines x 64 characters per line); an input keyboard consisting of single keystroke Basic language verbs; an 80 column dot matrix;√at least one system must have the capability of supporting a flexible disc storage unit with the capacity of 262,144 bytes; single or multiple magnetic tape cassette drives. The units shall have hard wired Basic interpreter capable of supporting string array manipulation and file handling on cassette without preformatting.

The system shall consist of the following components:

| | | | | |
|---|---|---|---|---|
| 1 | WANG Model 2220 Integrated Control Module 2" (Keyboard, CRT & Cassette) or equal<br>Consisting of:<br>A) An input keyboard containing most of the BASIC language verbs and commands as single keystroke entries, e.g., DIM, FOR, NEXT, PRINT, TRACE, etc. The keyboard contains all the alphabetic characters and the following special characters and the following special characters: +, -, *, /, ↑, (, ), <, >, =, semicolon, and period. A ten-key keyboard for entry of numerics, 0-9, and decimal point. Trig functions, arithmetic operators, and control keys are also standard on the keyboard; in addition to sixteen special function keys capable of accessing 16 user-defined operations.<br>B) A combined Cathode Ray Tube Display and Single Magnetic Tape Cassette Drive. The CRT must be capable of displaying a minimum of 16 lines, of 64 characters each at one time. The CRT must be 9" diagonal. | 6 | | |

QR #52775

Vendor ______________________________

| em | Description | Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| 1 (continued) | C) A Tape Cassette Drive capable of storing and recalling data and program information for the System. The Tape Drive must be able to drive a cassette holding 150' of magnetic tape on which can be recorded a minimum of 78,300 bytes and transfer at a minimum effective rate of 326 bytes/second including all gaps a and redundant recording. Use of the Tape Cassette Drive must not require preformatting of tapes | | | |
| 2 | CPU 4K Memory WANG Model 2200S-1 or equal | 6 | | |
| 3 | High Speed Printer - WANG Model 2231 or equal<br>Specifications:<br>A high-speed printer providing complete, high-speed, alphanumeric printing capability to the System; must print at a rate of 100 characters per second, using a matrix impact printing technique which can generate four carbon copies in addition to the original. Must print two selectable type sizes, composed either from a 5 x 7 dot matrix in normal size, or from a 10 x 7 dot matrix in expanded size. Instructions must consist of a complete alphabetic and numeric character set, all printable under program control from the System. | 2 | | |
| 4 | CPU Stands - WANG Model 2290 or equal | 6 | | |
| 5 | ONE SYSTEM SHALL CONSIST OF:<br>CPU 8K Memory, WANG WCS/20 or equal<br>A) Console<br>B) 12" Cathode Ray Tube incorporating a display with 16 lines by 64 characters per line.<br>C) Input keyboard of typewriter characters and single keystroke BASIC language verbs.<br>A removable flexible disk drive capable of storing programs and data for the System. The disk drive must provide a storage capacity of at least 262,144 bytes. Disk platters must be easily inserted in and removed from the unit; individual platters<br>(continued) | 2 | | |

QR #52775

Vendor ____________________

| em | Description | Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| 5 (continued) | must be formatted automatically by the unit. The System must provide the capability to read and write multi-sector records of any length, and to use entire arrays as arguments. The system also must provide a hard-wired internal data management system, as well as a number of BASIC statements and commands which permit the programmer to design his own disk management system. Finally, the system must provide a rapid platter-to-platter backup capability for at least two of the three disk drives in the disk unit. All of these features, as well as all interface and control electronics, must be included in the price quoted for the disk drive; none should be considered optional extras. | | | |
| 6 | Flexible Disc Platter WANG Model WES/20 or equal | 10 | | |
| 7 | Single Magnetic Tape Cassette Drive, WANG Model 2217 or equal<br>Specifications:<br>A single magnetic tape cassette drive capable of storing and recalling data and program information for the System. The Tape Drive must be able to drive a cassette holding 150' of magnetic tape on which could be recorded a minimum of 78,300 bytes and transfer at an effective numeric rate of 326 bytes/sec including all gaps and redundant recording. This unit does not require preformatted tapes. | 2 | | |
| 8 | Multiplexor, WANG or equal Perm 4 units [illegible]<br>To connect as many as four systems to the high speed printer | 2 | | 2,23 |
| 9 | 75 ft. Cassette WANG Model 174-1250 or equal | 30 | | |

QR #52775

Vendor ______________________

| Item | Description | Quantity | Unit Price | Total Price |
|---|---|---|---|---|
| | ALTERNATE BID - UPDATE OF EXISTING SYSTEM AT GHS | | | |
| ALTERNATE 1 | Edit Rom, WANG Character Editor ROM, Option 3 or equal | 3 | | |
| ALTERNATE 2 | Update Rom, with WANG Character Editor Rom, Option 3 or equal<br>For modifing a WANG 2200B (existing equipment) to a 2200C<br>MUST BE ADAPTABLE TO EXISTING EQUIPMENT | 1 | | |
| ALTERNATE 3 | High Speed Printer - WANG Model 2231 or equal<br>For modifing a WANG 2200B (existing equipment) to a 2200C. See detailed specification for Item 3<br>MUST BE ADAPTABLE TO EXISTING EQUIPMENT | 1 | | |
| ALTERNATE 4 | 4-K Memory Board, WANG or equal<br>4,096 Bytes of Memory<br>MUST BE ADAPTABLE TO EXISTING EQUIPMENT | 1 | | |
| ALTERNATE 5 | Central Multiplexor System, WANG 2200 or equal to connect up to 3 systems to High Speed Printer<br>MUST BE ADAPTABLE TO EXISTING EQUIPMENT | 1 | | |

# APPENDIX D8

## Purchase Order for Computer Hardware

DEPT. OF FINANCE FORM P.O. 1 REV. 7/71

**IMPORTANT**
VENDOR REFER ANY QUESTIONS AND MAIL ALL INVOICES TO THIS AGENCY FOR PAYMENT →

PURCHASE ORDER

# State of Delaware

Newark School District
83 E. Main St.
Newark, DE 19711

PURCHASE ORDER NUMBER
015201

ABOVE ORDER NUMBER MUST APPEAR ON ALL INVOICES, PACKING SLIPS AND CORRESPONDENCE

DATE

TO VENDOR
Wang Laboratories, Inc.
Attn: Mr. Nelson Bookbinder
570 Lancaster Avenue
Bryn Mawr, PA 19010

PLEASE DELIVER TO:
Newark School District
Newark, DE 19711

VENDOR CODE

TAX CLEARANCE

**INSTRUCTIONS TO VENDOR**

1 ANY QUESTIONS ON THIS ORDER MUST BE REFERRED TO THE ORDERING AGENCY. DO NOT PLACE INQUIRIES THROUGH DIVISION OF ACCOUNTING DEPARTMENT OF FINANCE.

2 THIS ORDER AND THE PERFORMANCE THEREOF SHALL BE CONSTRUED AND GOVERNED IN ACCORDANCE WITH THE LAWS OF THE STATE OF DELAWARE.

3 SEPARATE INVOICES MUST BE SUBMITTED FOR EACH ORDER. SUBMIT INVOICE IN TRIPLICATE.

4 ANY PRICE CHANGES MUST BE CLEARLY NOTED ON ALL COPIES OF INVOICE.

**AUTHORIZED DEPT. OR DIVISION SIGNATURES**

SIGNED ____________________

SIGNED ____________________

I, THE ABOVE, CERTIFY THAT THIS PURCHASE ORDER IS ISSUED IN CONFORMITY WITH ALL PERTINENT STATUTES, THAT THE ITEMS DESCRIBED ARE REQUESTED FOR THE EFFICIENT OPERATION OF THIS DEPARTMENT AND ARE PROPERLY CHARGEABLE TO THE FUNDS AND APPROPRIATION INDICATED HEREON.

| P.O. NUMBER | DEPT./DIV./SEC. | FUND | LINE | OBJ.-S/O | FUNCTION | PROGRAM | AMOUNT | T/C |
|---|---|---|---|---|---|---|---|---|
| 015201 | 9521640 | 01 | 65 | 70 | 2200 |  | $70,959.00 |  |
| PURCHASE ORDER TOTAL $ |  |  |  |  |  |  | 70,959.00 |  |

APPROVED FOR AVAILABLE FUNDS:

SIGNED ____________________
SECRETARY OF DEPARTMENT OF FINANCE OR DESIGNEE

**CONDITIONS**

1 ALL PRICES F.O.B. DESTINATION UNLESS OTHERWISE INDICATED

2 PRICES EXCLUSIVE OF FEDERAL TAXES

3 PURCHASE ORDER NOT VALID UNLESS SIGNED BY SECRETARY OF DEPARTMENT OF FINANCE OR HIS DESIGNEE OR UNDER $[illegible] OR MARKED EMERGENCY

| DATE OF BID | CONTRACT # | SHIP VIA | DELIVERY DATE | TERMS |
|---|---|---|---|---|
|  |  |  |  |  |

| ITEM | OBJECT | SUB OBJECT | DESCRIPTION | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|---|
|  |  |  | AS PER YOUR BID QUOTE FOR QR 52775 OPENED JUNE 25, 1975: |  |  |  |
| 1 |  |  | WANG Model 2220 Integrated Control Module (Keyboard, CRT and Cassette)<br>Delivery as follows: 3 - Newark High School, Delaware Ave., Newark<br>3 - Christiana High School, Salem Church Road | 6 | 2895.00 | $17,370.00 |
| 2 |  |  | CPU 4K Memory Wang Model 2200S-1<br>Delivery as follows: 3 - Newark High School<br>3 - Christiana High School | 6 | 2316.00 | 13,896.00 |
| 3 |  |  | High Speed Printer - Wang Model 2231<br>Delivery as follows: 1 - Newark High School<br>1 - Christiana High School | 2 | 3184.50 | 6,369.00 |
|  |  |  | -continued- |  |  |  |
|  |  |  |  | TOTAL | $ | 70,959.00 |

7/16/75

#6

VENDOR'S COPY

# State of Delaware

# CONTINUATION SHEET

## PURCHASE ORDER

PURCHASE ORDER NO. 015201

PAGE 2 w OF ____ PAGES

VENDOR: Wang Laboratories, Inc.

| ITEM | OBJECT | DESCRIPTION | QUANTITY | UNIT PRICE | AMOUNT |
|---|---|---|---|---|---|
| 4 | | CPU Stands - Wang Model 2290 | 6 | 241.25 | 1,447.50 |
| | | Delivery as follows: 3 - Newark High School<br>3 - Christiana High School | | | |
| 5 | | CPU 8K Memory, Wang WCS/20 | 2 | 9650.00 | 19,300.00 |
| | | Delivery as follows: 1 - Newark High School<br>1 - Christiana High School | | | |
| 6 | | Flexible Disc Platter Wang Model WES/20 | 10 | N/C | N/C |
| | | Delivery as follows: 5 - Newark High School<br>5 - Christiana High School | | | |
| 7 | | Single Magnetic Tape Cassette Drive, Wang Model 2217 | 2 | 1302.75 | 2,605.50 |
| | | Delivery as follows: 1 - Newark High School<br>1 - Christiana High School | | | |
| 8 | | Multiplexor, Wang | 2 | 1061.50 | 2,123.00 |
| | | Delivery as follows: 1 - Newark High School<br>1 - Christiana High School | | | |
| 9 | | 75 ft. Cassette Wang Model 174-1250 | 30 | N/C | N/C |
| | | Delivery as follows: 15 - Newark High School<br>15 - Christiana High School | | | |
| | | ---------------- | | | |
| | | Delivery of the following to: Glasgow High School<br>1901 S. College Ave.<br>Newark, DE | | | |
| Alt. 1 | | Edit Rom, Wang Character Editor ROM, Option 3 | 3 | 386.00 | 1,158.00 |
| Alt. 2 | | Update Rom, with Wang Character Editor Rom, Option 3. For modifying a WANG 2200B to a 2200C | 1 | 900.00 | 900.00 |
| Alt. 3 | | High Speed Printer - Wang Model 2231. For modifying a Wang 2200B to a 2200C | 1 | 3184.50 | 3184.50 |
| Alt. 4 | | 4-K Memory Board, Wang | 1 | 1544.00 | 1544.00 |
| Alt. 5 | | Central Multiplexor System, Wang 2200 | 1 | 1061.50 | 1061.50 |
| | | TOTAL THIS PAGE | | | |

VENDOR'S COPY

# APPENDIX D9

## Letter Ordering Project Delta Terminals

6/2

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE 19711

TELEPHONE 302 731-2000

ADMINISTRATION BUILDING
83 EAST MAIN STREET

Dr. Allen

OK to send, or do you want to send under your signature?

Thanks,

Neil Walzl

May 30, 1975

Mrs. Teresa Green, Director
Project DELTA
Room 248, Du Pont Hall
University of Delaware
Newark, Delaware 19711

Dear Mrs. Green:

The Newark School District would like to participate in Project DELTA for the 1975-76 school year. Our needs are as follows:

(a) Christiana High School - two terminals
(b) Glasgow High School - one terminal
(c) Newark High School - one terminal

It is our understanding that the cost is $3,000 per terminal for a total of $12,000. The locations for the terminals has not been determined as yet, but will be established within the next few weeks.

In addition to the services that have been offered by Project DELTA in previous years, we are assuming that a college/career guidance package will be available during the 1975-76 school year. If the guidance package will not be available, please let us know immediately, as our decision to participate is partially based on the availability of this package and our needs will not be the same.

Sincerely,

F. Neil Walzl

F. Neil Walzl
Supervisor of Mathematics

FNW:bap

cc: Dr. Allen
Mrs. Bonney
Mr. Freidly

# THE DEVELOPMENT AND IMPLEMENTATION OF A DISTRICT COMPUTER EDUCATION PROGRAM

## APPENDIX E

### Evaluation

E1: Summary Results of Workshop Participants' Inservice and Workshop Opinion Survey

E2: Summary Results of Fall Survey of Workshop Participants

# APPENDIX E1

Summary Results of Workshop Participants' Inservice and Workshop

SPRING INSERVICE COMPUTER WORKSHOP SUMMARY SHEET-NUMBER OF RESPONSES

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE

## INSERVICE AND WORKSHOP OPINION SURVEY

(Please indicate your response on the scale provided)

| | | 5 | 4 | 3 | 2 | 1 | | |
|---|---|---|---|---|---|---|---|---|
| 1. | Preparation by leader: | 20 | | | | | Adequate | Inadequate |
| 2. | Inclusion of pertinent topics: | 15 | 5 | | | | Sufficient | Insufficient |
| 3. | Budgeting of time: | 11 | 9 | | | | With Wisdom | Wasteful |
| 4. | Explanation of Objectives: | 16 | 4 | | | | Thorough | Incomplete |
| 5. | Participant's Awareness of Objectives: | 17 | 2 | | | 1 | Clear | Vague |
| 6. | Length of Time of Workshop: | 12 | 5 | 2 | 1 | | Sufficient | Too Short |
| 7. | Physical facilities: | 18 | 2 | | | | Suitable | Unsuitable |
| 8. | Resource materials and/or personnel: | 18 | 2 | | | | Available | Lacking |
| 9. | Variety of Activities: | 9 | 10 | 1 | | | Sufficient | Insufficient |
| 0. | Accomplishment of Objectives: | 11 | 8 | 1 | | | Too a great extent - | Not at All |
| . | "Take Home" plans or ideas: | 14 | 5 | 1 | | | Useful | "Round File" |

MMENTS: (Use back of page)

. Strengths of Workshop

. Weaknesses of Workshop

. Suggestions for 1975-76
(PLEASE GIVE THOUGHT TO THIS. YOUR SUGGESTIONS WILL BE USED IN PLANNING FOR NEXT YEAR. THIS IS YOUR OPPORTUNITY FOR INPUT IN THE DISTRICT'S INSERVICE PLANNING. THANK YOU.)

jh
/75

WORKSHOP #22
NAME AND/OR NUMBER OF WORKSHOP

SPRING INSERVICE WORKSHOP SUMMARY SHEET-PERCENTAGE OF RESPONSES

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE

## INSERVICE AND WORKSHOP OPINION SURVEY

(Please indicate your response on the scale provided)

| | | | | | |
|---|---|---|---|---|---|
| 1. Preparation by leader: | 100%<br>5<br>Adequate | 4 | 3 | 2 | 1<br>Inadequate |
| . Inclusion of pertinent topics: | 75%<br>5<br>Sufficient | 25%<br>4 | 3 | 2 | 1<br>Insufficient |
| . Budgeting of time: | 55%<br>5<br>With Wisdom | 45%<br>4 | 3 | 2 | 1<br>Wasteful |
| 4. Explanation of Objectives: | 80%<br>5<br>Thorough | 20%<br>4 | 3 | 2 | 1<br>Incomplete |
| 5. Participant's Awareness of Objectives: | 85%<br>5<br>Clear | 10%<br>4 | 3 | 2 | 5%<br>1<br>Vague |
| 6. Length of Time of Workshop: | 60%<br>5<br>Sufficient | 25%<br>4 | 10%<br>3 | 5%<br>2 | 1<br>Too Short |
| 7. Physical facilities: | 90%<br>5<br>Suitable | 10%<br>4 | 3 | 2 | 1<br>Unsuitable |
| 8. Resource materials and/or personnel: | 90%<br>5<br>Available | 10%<br>4 | 3 | 2 | 1<br>Lacking |
| 9. Variety of Activities: | 45%<br>5<br>Sufficient | 50%<br>4 | 5%<br>3 | 2 | 1<br>Insufficient |
| 0. Accomplishment of Objectives: | 55%<br>5<br>Too a great extent - | 40%<br>4 | 5%<br>3 | 2 | 1<br>Not at All |
| 1. "Take Home" plans or ideas: | 70%<br>5<br>Useful | 25%<br>4 | 5%<br>3 | 2 | 1<br>"Round File" |

OMMENTS: (Use back of page)

. Strengths of Workshop

. Weaknesses of Workshop

. Suggestions for 1975-76
(PLEASE GIVE THOUGHT TO THIS. YOUR SUGGESTIONS WILL BE USED IN PLANNING FOR NEXT YEAR. THIS IS YOUR OPPORTUNITY FOR INPUT IN THE DISTRICT'S INSERVICE PLANNING. THANK YOU.)

mjh
1/75

WORKSHOP #22
NAME AND/OR NUMBER OF WORKSHOP

## SPRING INSERVICE TRAINING WORKSHOP
## (Workshop #22)

### SUMMARY OF COMMENTS UNDER WEAKNESSES OF WORKSHOP

1. Too many participants
2. None!
3. None!
4. Not wise to have "experts" in class with people who "know nothing!"

### SUMMARY OF COMMENTS UNDER STRENGTHS OF WORKSHOP

1. Sufficient hardware
2. Hands-on experience available
3. I learned something new!!!
4. Best I've ever been to
5. An opportunity was provided to have hands-on experiences and apply theories to my particular field.
6. A knowledgeable instructor who was well versed-excellent equipment.
7. This workshop was excellent. I would like to participate in more workshops on the same subject matter with the same persons in charge.

# COMPUTER TRAINING WORKSHOP FOR TEACHERS

## PRELIMINARY REPORT

During the week of June 23, 1975, a fifteen hour workshop was conducted at Glasgow High School. The purpose of the workshop was to train non-mathematics oriented teachers in the use of the computer. Thirty teachers (nine from Christiana High, eleven from Glasgow High, and ten from Newark High) attended the workshop. Mr. Carl Jacobson, a mathematics teacher at Glasgow High was the instructor.

Activities included a brief survey of the historical development of computers and the growth of computer utilization (educational and administrative) in the Newark School District. The participants where then given instruction on the use of the Wang 2200 computer. Following machine familiarization, the participants were introduced to the BASIC computer language and were given an opportunity to write programs. Finally, the participants were made aware of the canned programs available and were given an opportunity to try several for their reactions.

Throughout, the workshop was conducted informally. The usual method of instruction was for half the participants to be working independently on the machines while the instructor was working more formally with the remaining half. In this way, hands-on time on the machines was maximized.

Participants were given an opportunity to evaluate the workshop at its conclusion. Except for the length, majority of the participants rated the workshop above average. Comments concerning Mr. Jacobson's preparation and method of presentation were extremely positive.

Weaknesses noted were mostly related to too many participants and a lack of time.

Summary sheets of participants' responses are attached.

Based on the responses of the participants, additional workshops will be planned for the 1975/76 school year.

FNW:bap
8/1/75

COMPUTER TRAINING WORKSHOP SUMMARY SHEET-NUMBER OF RESPONSES

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE

## INSERVICE AND WORKSHOP OPINION SURVEY

(Please indicate your response on the scale provided)

| | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| 1. Preparation by leader: | 22 | 6 | | | |
| | Adequate | | | | Inadequate |
| 2. Inclusion of pertinent topics: | 13 | 13 | 2 | | |
| | Sufficient | | | | Insufficient |
| 3. Budgeting of time: | 11 | 8 | 8 | 1 | |
| | With Wisdom | | | | Wasteful |
| 4. Explanation of Objectives: | 23 | 3 | 2 | | |
| | Thorough | | | | Incomplete |
| 5. Participant's Awareness of Objectives: | 24 | 2 | 2 | | |
| | Clear | | | | Vague |
| 6. Length of Time of Workshop: | 8 | 5 | 4 | 5 | 6 |
| | Sufficient | | | | Too Short |
| 7. Physical facilities: | 18 | 5 | 3 | 2 | |
| | Suitable | | | | Unsuitable |
| 8. Resource materials and/or personnel: | 15 | 9 | 4 | | |
| | Available | | | | Lacking |
| 9. Variety of Activities: | 16 | 9 | 2 | | |
| | Sufficient | | | | Insufficient |
| 0. Accomplishment of Objectives: | 15 | 9 | 3 | | |
| | Too a great extent - Not at All | | | | |
| 1. "Take Home" plans or ideas: | 11 | 6 | 7 | 2 | |
| | Useful | | | | "Round File" |

OMMENTS: (Use back of page)

1. Strengths of Workshop
2. Weaknesses of Workshop
3. Suggestions for 1975-76
(PLEASE GIVE THOUGHT TO THIS. YOUR SUGGESTIONS WILL BE USED IN PLANNING FOR NEXT YEAR. THIS IS YOUR OPPORTUNITY FOR INPUT IN THE DISTRICT'S INSERVICE PLANNING. THANK YOU.)

jh
1/75

NAME AND/OR NUMBER OF WORKSHOP

## COMPUTER TRAINING WORKSHOP SUMMARY SHEET-PERCENT OF RESPONSES

NEWARK SCHOOL DISTRICT
NEWARK, DELAWARE

## INSERVICE AND WORKSHOP OPINION SURVEY

(Please indicate your response on the scale provided)

| | | 5 | 4 | 3 | 2 | 1 | | |
|---|---|---|---|---|---|---|---|---|
| 1. | Preparation by leader: | 79% | 21% | | | | Adequate | Inadequate |
| 2. | Inclusion of pertinent topics: | 46% | 46% | 7% | | | Sufficient | Insufficient |
| 3. | Budgeting of time: | 39% | 29% | 29% | 4% | | With Wisdom | Wasteful |
| 4. | Explanation of Objectives: | 82% | 11% | 7% | | | Thorough | Incomplete |
| 5. | Participant's Awareness of Objectives: | 86% | 7% | 7% | | | Clear | Vague |
| 6. | Length of Time of Workshop: | 29% | 18% | 14% | 18% | 21% | Sufficient | Too Short |
| 7. | Physical facilities: | 64% | 18% | 11% | 7% | | Suitable | Unsuitable |
| 8. | Resource materials and/or personnel: | 54% | 32% | 14% | | | Available | Lacking |
| 9. | Variety of Activities: | 59% | 33% | 7% | | | Sufficient | Insufficient |
| 0. | Accomplishment of Objectives: | 56% | 33% | 11% | | | Too a great extent - | Not at All |
| 1. | "Take Home" plans or ideas: | 42% | 23% | 27% | 8% | | Useful | "Round File" |

OMMENTS: (Use back of page)

. Strengths of Workshop

. Weaknesses of Workshop

. Suggestions for 1975-76
(PLEASE GIVE THOUGHT TO THIS. YOUR SUGGESTIONS WILL BE USED IN PLANNING FOR NEXT YEAR. THIS IS YOUR OPPORTUNITY FOR INPUT IN THE DISTRICT'S INSERVICE PLANNING. THANK YOU.)

jh
1/75

NAME AND/OR NUMBER OF WORKSHOP

## COMPUTER TRAINING WORKSHOP

## SUMMARY OF COMMENTS UNDER STRENGTHS OF WORKSHOP

1. The time devoted to participants who were not "computer-minded."
2. Time was available to discuss computer applications with others.
3. You received both explanation and practical application. It was great for the novice.
4. The instructor worked at our level.
5. Carl Jacobson did an excellent job presenting the material.
6. The instructor was patient, knowledgeable, and well-versed.
7. We were able to work with teachers in various fields of study and from different schools which helped to improve communication and associations. It helped to exchange ideas for programs.
8. A good experience. I now have a good attitude toward computers and computer know-how.
9. Meeting the objectives.
10. The diversity of people participating.
11. The length.
12. Excellent instructor - activities were made enjoyable.
13. Carl was well prepared and able to communicate the subject matter to even those of us who have grown stale in the math-science orientation. The experience has "wet" my appetite to perhaps study the area further.

14. Good presentation

15. An enthusiastic and knowledgeable instructor.
A good man!

16. A cohesive, interested group of students.

17. An insight into the world of computers

18. A good exposure.

19. The mini-course was well-organized and proceeded quite rapidly from total ignorance (on my part) to some sort of understanding.

20. Carl easily understood.

21. Good instructor.

## COMPUTER TRAINING WORKSHOP

## SUMMARY OF COMMENTS UNDER WEAKNESSES OF WORKSHOP

1. The workshop was great except for number of people and too few computers. Also some more people to help Carl would have been good.
2. There should have been more instructors to give more individualization.
3. More time for neophytes is needed.
4. Too many people per instructor. A limit of 15 would be better. Also, it would be nice to go 2 weeks.
5. Possibly someone to aid while we're working on the computers and the instructor is lecturing.
6. I would like to work on a more advanced level of programming so that I improve my quiz and test programs. Also, I would like to supervise the student's operation of the computer to get a better understanding of their capabilities.
7. The workshop probably was too short for those people who definitely want to use computers in their program.
8. Too many people - not enough time on machine.
9. Not enough time.
10. A longer time is needed for more programming.
11. Some of us needed more time.
12. Too much idle time.
13. Some inactive spots during the "shift changes" from the machine group to the "listening" group.

14. Some difficulty in hearing while the machine group was at work.
15. The instructor could probably have used knowledgeable aides in instruction of operation of machine to use time more efficiently.
16. More time, more machines.
17. Not enough computers.
18. Budgeting of time - handouts on instructions would be useful.
19. Needed more time to completely understand how to program and score tests.
20. Too short in length.

FNW:bap
8/1/75

# COMPUTER TRAINING WORKSHOP

## SUMMARY OF SUGGESTIONS FOR 1975-76

1. Repeat the same procedure.
2. Perhaps a continuation of this would be desirable
3. I strongly suggest a similiar experience for all faculty members at each high school. As an educational tool, we probably have hardly begun to explore the possibilities of computer.
4. Bring back the same instructor - he is excellent.
5. There is a need for an extended workshop to more fully learn a computer language.
6. For those who are going to use computers during the year, hold another high level workshop.
7. Hold a workshop for each teacher in the district.
8. Compile an actual list of programs useful to particular course or subject matter.
9. Plan a 3-week workshop next year.
10. English, math, and other teachers to work separately and decide if and how the computer can be used in their classes.

## APPENDIX E2

### Summary Results of Fall Survey of Workshop Participants

SUMMARY SHEET -
NUMBER OF RESPONSES

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

October 23, 1975

MEMORANDUM TO: Participants of Computer Education Workshops

FROM: F. Neil Walzl FNW

RE: Follow-up Survey

In order to find out what impact was made by the computer education workshops held last spring and summer, it is necessary that I receive some feedback from you. Therefore, would you please take a few minutes to answer the following questions. After completing the questions, please return the sheet to me at the Administration Building.

Thanks.

1. Which workshop did you attend? ______

2. Based on your experiences in the workshop do you think you can?

   a. operate the in-house computer in your school? Yes 51 No 6
      Have you? Yes 29 No 28
   b. Write a simple program in BASIC? Yes 45 No 12
      Have you? Yes 29 No 28
   c. Explain to another person how to operate the in-house computer? Yes 45 No 12
      Have you? Yes 25 No 32

3. Have you discussed computers and their uses with your classes? Yes 37 No 20

4. If your answer to #3 is no, do you plan to in the future? Yes 14 No 6

5. Have you made use of any computer applications in your classes? Yes 19 No 38

   If your answer is yes, please list the applications.

6. If your answer to #5 is no, do you plan to in the future? Yes 20 No 10 undecided 8

7. Are any of your students using the computer in conjunction with your course? Yes 23 No 34

8. Have you developed any computer applications for use in areas other than instruction? (grading, etc.) Yes 19 No 38

   If your answer is yes, please list the applications.

9. Are you familiar with the Computer Curriculum Guide? Yes 45 No 12

10. Please list any additional comments you deem appropriate.

mhh
10/23/75

SUMMARY SHEET
PERCENT OF RESPONSES

NEWARK SCHOOL DISTRICT
OFFICE OF INSTRUCTIONAL SERVICES
NEWARK, DELAWARE

October 23, 1975

MEMORANDUM TO: Participants of Computer Education Workshops

FROM: F. Neil Walzl FNW

RE: Follow-up Survey

In order to find out what impact was made by the computer education workshops held last spring and summer, it is necessary that I receive some feedback from you. Therefore, would you please take a few minutes to answer the following questions. After completing the questions, please return the sheet to me at the Administration Building.

Thanks.

1. Which workshop did you attend? ______________________________

2. Based on your experiences in the workshop do you think you can?
    a. operate the in-house computer in your school? Yes 89% No 11%
        Have you? Yes 51% No 49%
    b. Write a simple program in BASIC? Yes 79% No 21%
        Have you? Yes 51% No 49%
    c. Explain to another person how to operate the in-house computer? Yes 79% No 21%
        Have you? Yes 44% No 56%

3. Have you discussed computers and their uses with your classes? Yes 65% No 35%

4. If your answer to #3 is no, do you plan to in the future? Yes 24% No 11%

5. Have you made use of any computer applications in your classes? Yes 33% No 67%

    If your answer is yes, please list the applications.

6. If your answer to #5 is no, do you plan to in the future? Yes 35% No 18% undecided 14%

7. Are any of your students using the computer in conjunction with your course? Yes 40% No 60%

8. Have you developed any computer applications for use in areas other than instruction? (grading, etc.) Yes 33% No 67%

    If your answer is yes, please list the applications.

9. Are you familiar with the Computer Curriculum Guide? Yes 79% No 21%

10. Please list any additional comments you deem appropriate.

mhh
10/23/75

# COMPUTER EDUCATION WORKSHOP FOLLOW-UP SURVEY

## SUMMARY OF CLASS APPLICATIONS

October, 1975

Evaluation of determinants

Finding Slope and y-intercept

Prime Factorization

Canned programs: Policy, Onions, Market, Psychology Review

Limit program

Graphing
Review questions for English grammar

Simulations for Engligh grammar

Random test generator

Evaluation of data bases

Multiple choice review questions for German

Probability

Pascal's Triangle

Factoring exercises

Compound interest

Use canned programs for aero-space course

Programs for solution of physics problems

Input-output of functions

Calculus limit demonstrations

Basic Skills drills

Basic Skills homework checks

## COMPUTER EDUCATION WORKSHOP FOLLOW-UP SURVEY

## SUMMARY OF OTHER APPLICATIONS

1. Grading applications (7)
2. Statistical analysis of tests for driver education
3. Record keeping for chess club
4. School-wide attendence
5. Introduce the computer to the Sci-Fi club
6. Baseball statistics keeping
7. Test administering